

VEGETABLE. SUBSTANCES

USED FOR

THE FOOD OF MAN.

VOL. II.

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THE FOOD OF MAN.

CHAPTER. XIII.

CARBONACEOUS SECRETIONS *continued*:---SUGAR.

SUGAR is one of the carbonaceous principles of plants, and is found sparingly in the animal kingdom, more especially in the milk of the Mammalia. It varies slightly in its composition, according to the sources from which it is obtained. The great proportion of the sugar used by man as an article of diet is obtained from the sugar-cane, the *Saccharum officinarum* of botanists. The properties of cane-sugar are more or less partaken of by that obtained from other sources. When sugar is pure, it is colourless, inodorous, of a purely sweet taste, and moderately hard and brittle. It assumes a crystalline form, and when the crystals are rapidly formed, as in common refined sugar, they are small; but when they are obtained by the rapid evaporation of a strong solution of sugar, as in the making sugar-candy, they may be procured of a very large size. Sugar has a specific gravity of about 1.065: it undergoes no change when exposed to the air, and when moderately heated loses only a little hygrometric moisture. It is soluble in one-third of its weight of cold water; but with hot water it combines in all proportions. It melts at a temperature of 365° , and when cooled suddenly, becomes a transparent mass, which is sold in the shops under the name of barley-sugar. When exposed to a very high temperature, sugar

undergoes decomposition, yielding various gaseous compounds, leaving behind carbon in the form of charcoal. In chemical combination it acts in the same way as an acid, and has the power of uniting with the alkalis and oxides of metals, forming salts, which have been called saccharates.

According to the analysis of Berzelius, cane-sugar consists of—

12 equivalents of carbon . .	72	or	6.4
11 equivalents of hydrogen . .	11	or	42.1
11 equivalents of oxygen . .	88	or	51.5
	<hr/>		
Equivalent . .	171		100

When this is exposed to heat, two equivalents of hydrogen and two of oxygen, or two of water, are given off, and a substance containing twelve atoms of carbon and nine of water is left, which is sometimes called caramel. The sugar obtained from the maple and from beet-root has the same composition as cane-sugar.

The sugar of the grape differs somewhat from the preceding. It has the following composition:—

12 equivalents of carbon . .	72	or	36.36
14 equivalents of hydrogen . .	14	or	7.07
14 equivalents of oxygen . .	112	or	56.57
	<hr/>		
Equivalent . .	198		100

The sugar formed in the human system, in the disease called diabetes, has the same composition as grape-sugar, so also has the sugar of honey, and the sugar of all fruits. A sugar of the same composition is obtained by the action of diastase and sulphuric acid on starch. This sugar is however uncrystallizable, a property possessed by the sugar that is developed during the decomposition of many plants.

Manna and liquorice, although they are sweet, are not forms of sugar, for all sugars are susceptible of being converted into alcohol by fermentation. Molder suggests that these substances are produced in plants by the decomposition of cane or grape-sugar. This infinite is

produced from beet-sap when it is fermented at a high temperature, and during the change of starch into grape-sugar by the action of sulphuric acid. Manna, or mannite, as it is called, when free from impurities, has the following composition:—

6 equivalents of carbon . . .	36	or	39.6
7 equivalents of hydrogen . . .	7	or	7.6
6 equivalents of oxygen . . .	48	or	52.8
	<hr/>		
Equivalent . . .	91	.	100

Glycyrrhizine, or pure liquorice, is composed as follows:—

16 equivalents of carbon	96
12 equivalents of hydrogen	12
6 equivalents of oxygen	48
	<hr/>
Equivalent	156

The sugar of the milk of the human being and of the Mammalia has also a peculiar composition, but is a true sugar. It has—

24 equivalents of carbon . . .	144	or	43.46
24 equivalents of hydrogen . . .	24	or	6.61
24 equivalents of oxygen . . .	192	or	52.93
	<hr/>		
Equivalent . . .	360		100

Sugar is not so widely distributed in the vegetable kingdom as starch, but it appears constantly to exist as the result of the decomposition of starch. It presents itself especially during the germination of plants; and a knowledge of this fact has led to the process of malting for the purpose of obtaining sugar for the fermentation of beer. Sugar is found in the sap of many trees, as the maple, birch, and others; and is found in the stems of most of the Cerealia and other Gramineæ. It is also present in many fleshy roots, as the carrot, turnip, parsnep, and beet-root, and in the fruits of a great number of plants. Although in all cases starch seems to be deposited before sugar in the cells of plants, yet at certain periods in their

growth the sugar is either again transformed into starch, or removed by decomposition, as we find many parts of plants sweet when they are young, which are not so when they become old; the sweetness of the seeds of the pea when green, and that of the stems of many grasses when young, are examples.

Sugar when taken into the system appears to act in the same way as starch. It is taken into the circulation, and there becoming converted into tannic, it is burned in contact with oxygen, and assists in maintaining animal heat. Like starch also, when not entirely burned in the system, it is converted into oil, and is deposited in the tissues in the form of fat. It is on this account that sugar has been regarded as "nutritious." It is not, however, nutritious in the sense of adding to the living tissues of the body; no one can live on pure sugar, and experiments were performed by Majendie on dogs, which, when fed entirely on sugar, died. At the same time it is well known that the negroes, during the time they are getting in the sugar-plants in the West Indies, live almost entirely on the sugar-cane. That they can do so arises from the fact, that the sugar-cane, in addition to the sugar, contains large quantities of protein, in the form of albumen. This substance then supplies nutrition, whilst the sugar acts on the system as the other carbonaceous secretions.

Sugar is more easily digestible than starch, and is on this account supplied to the young animals of the various species of Mammalia. It is the carbonaceous secretion which of all others is most adapted for children, and their instinctive love of it seems to point out the value of it to them as a diet. Sugar should not, however, be administered alone as an article of diet, but where properly mixed with from 70 to 90 per cent. of other kinds of food, children will scarcely take too much of it. The coarser the sugar the better it is as a diet, as it contains more of the proteinaceous impurities of the cane. Thus brown sugar, in this point of view, is better than white, and treacle or molasses is better than either.

Although sugar may be eaten with impunity by the

young, caution ought to be exercised in feeding upon it by the adult, especially where there is any tendency to indigestion. If sugar is not properly digested in the stomach, it quickly decomposes, sometimes forming oxalic acid, but more frequently lactic acid, and by this means lays the foundation of dangerous diseases.

The principal supply of sugar for consumption in Great Britain is obtained from the sugar-cane, although small quantities are obtained from other sources. The quantity of sugar obtained from various parts of the world was, in 1839, estimated as follows:—

	Cwt.
British sugar colonies	3,571,378
British India	519,126
Danish West Indies	450,000
Dutch West Indies	260,060
French sugar colonies	2,160,000
United States of America	900,000
Brazil	2,400,000
Spanish West Indies	4,481,342
Java	892,475
For internal consumption, exclusive of China, India, Siam, Java, and the United States	2,446,337
Total	18,080,658

The consumption of the United Kingdom is about one-fifth of the above quantity. There is a remarkable fact connected with the sugar-trade of this country, and that is, that although the population of the country has nearly doubled in that time, the consumption of sugar has not increased in anything like the same proportion. In 1820 the consumption of sugar in this country was about 3,000,000 of cwts.; in 1840 it was not more than 3,500,000. There can be no doubt that this limited supply depends on the restriction which exists with regard to the admission of sugar from other colonies than our own. Sugar is not only thus kept up at an enormous price, but the whole junior population of the country is kept upon a limited supply of an article of food which

seems especially created for their use. The philanthropy which would urge as an objection to the free trade in sugar, that some of it is produced by means of slaves, forgets that there may be suffering at home for the want of it, setting aside the probability there is that a free trade in sugar would be a death-blow to slavery throughout the sugar colonies of the world.

CHAPTER XIV.

SUGAR-CANE.

THE Sugar-cane (*Saccharum officinarum*) must be considered as a native of China, since it has been pretty accurately shown that its cultivation was prosecuted in that empire for two thousand years before sugar was even known in Europe, and for a very long period before other eastern nations became acquainted with its use. For some time after this substance, in its crystalline form, had found its way to the westward, through India and Arabia, a singular degree of ignorance prevailed in regard to its nature and the mode of its production; and there is reason for believing that the Chinese, who have always evinced an unconquerable repugnance to foreign intercourse, purposely threw a veil of mystery over the subject. Persons have not been wanting, even in modern times, who have approved of this anti-social spirit, as being the perfection of political wisdom;—but is it not a complete answer to their opinion, that every nation which has cultivated commercial relations has been steadily advancing in civilization, and adding most importantly to the sum of its comforts and conveniences; while the inhabitants of China, although possessed of the greatest natural advantages, arising from variety of soil and climate, and whereby they had so long ago placed themselves in advance of other people, have remained altogether stationary? The case of this extraordinary people forms altogether, and in many ways, a standing enigma in the history of our species, the solving of which could not fail to prove highly instructive and interesting.

A knowledge of the origin of cane-sugar was correctly revealed in the middle of the thirteenth century, by the



Sugar-canes.

celebrated traveller Marco Polo ; though it was partially known much earlier. The plant was soon conveyed to Arabia, Nubia, Egypt, and Ethiopia, where it became extensively cultivated. Early in the fifteenth century the sugar-cane first appeared in Europe. Sicily took the lead in its cultivation ; thence it passed to Spain, Madeira, and the Canary Islands ; and shortly after the discovery of the New World by Columbus,

this plant was conveyed to Hayti and Brazil, from which latter country it gradually spread through the islands of the West Indies.

The canes of the sugar-cane have knotty stalks, and at each joint or knot a leaf is produced. The number of joints varies in different specimens, some having as many as eighty, and others not half that number. There are now several varieties cultivated in the American colonies, which were conveyed to that quarter, about the end of the last century, from the islands of Bourbon, Java, and Otaheite. These are so far superior to the old plant, that its cultivation has nearly ceased. The new varieties are larger in diameter, have a much greater distance between the joints, and come sooner to maturity than the old Brazil cane. This occupies, from the time of its being planted until it is fit for being cut, a period of from twelve to twenty months; while the larger varieties, by which it has been superseded, are fully ripe in ten months.

The sugar-cane varies exceedingly in its growth, depending upon the nature of the soil. In new and moist land it sometimes attains the height of twenty feet; while in ground that is arid and calcareous, its length does not exceed from six to ten feet. It is always propagated from cuttings. When sown in the colonies of America, the seeds have never been known to vegetate; and although there must, doubtless, be some country where the course of nature could be followed in this respect, we are not acquainted with any place in which the cultivators resort to the sowing of seed, in order to the propagation of the plant. The top joints are always taken for planting, because they are less rich in saccharine juice than the lower parts of the cane, while their power of vegetation is equally strong. The cane-plant is possessed of the power of tillering, in a manner similar to that shown by wheat, although not to an equal extent.

In preparing a field for planting with the cuttings of cane, the ground is marked out in rows three or four feet apart, and in these lines holes are dug from eight to

twelve inches deep, and with an interval of two feet between the holes. Where the ground is level, larger spaces are left at certain intervals, for the facility of carting; but there are many situations at the sides of steep hills where no cart can be taken, and in such cases these spaces are not required. The ripe canes are then conveyed to the mill in bundles on the backs of mules, or are passed down to the bottom of the hill through wooden spouts.

The hoeing of a cane-field is a most laborious operation when performed, as it must be, under the rays of a tropical sun. Formerly this task was always effected by hand labour, but, of late years, where the nature of the ground will admit of the employment of a plough, that instrument has been substituted, to the mutual advantage of the planter and his labourers. The planting of canes does not require to be renewed annually; in such a case the utmost number of labourers now employed on a sugar-plantation would be wholly inadequate to its performance. The most general plan is for a certain portion of the land in cultivation to be planted annually and in succession, the roots and stoles of the canes of the former year being left, through the remaining parts of the plantation. From these, fresh canes, which are called ratoon, spring up, and are nearly as large the first year as plant-canecan. Ratoon canes have a tendency to deteriorate—at least in size—every year they are continued, for which reason the progressive renewal of the plants is adopted. This plan may, however, be continued with very good effect for several years, provided the roots are furnished every year with a liberal supply of manure, that the ground about them is well loosened, and that all weeds are carefully removed. In this way it is said the same roots have been made to send up canes during twenty years. In some few cases the planters adopt a different course, and never wholly renew any individual field of canes, but content themselves with supplying new cuttings in such particular spots as from time to time appear to be thin.

The mode of cultivation varies in some particulars in

different countries. In India, where the price paid for daily labour is exceedingly small, great pains are taken in preparing the ground for the reception of the plants, which are carefully weeded and watered, and freed from insects, at all periods of their growth, when such operations are called for. Unfortunately for the Indian sugar-cultivator, something more than mere labour is required for the proper manufacture of his produce—an acquaintance with chemical science, and the possession of adequate apparatus—in both which particulars he is lamentably deficient. The Indian agriculturist would suffer martyrdom rather than be guilty of the crime of innovation; the discoveries of scientific men are to him as though they never had been made, and in conducting processes he is contented with apparatus, the total cost of which does not exceed many shillings, where manufacturers of other countries think it necessary to expend many hundred pounds. If their inveterate prejudices could be overcome, and the Indian sugar-planters were furnished with adequate utensils, there is every reason to believe that the markets of Europe could be supplied thence with sugar of a quality quite equal to that of West-India manufacture, and at a considerably lower cost.

The manufacture of sugar is a somewhat complicated process, requiring for its successful performance not only some degree of chemical knowledge, but likewise a considerable amount of practical experience. We must content ourselves here with giving the merest outline of the operations, referring the reader who is curious in such matters to books wherein the whole details are given.

When the canes are fully ripe they are cut close to the stole, and being then divided into convenient lengths, are tied up in bundles, and conveyed to the mill. This always consists of three iron cylinders, sometimes standing perpendicularly in a line with each other, and at other times placed horizontally, and disposed in the form of a triangle, and so adjusted that the canes, on being passed twice between the cylinders of either kind

of mill, shall have all their juice expressed. This is collected in a cistern, and must be immediately placed under process by heat to prevent its becoming acid, an effect which has sometimes commenced as early as twenty minutes from the time of its being expressed. A certain quantity of lime in powder, or of lime-water, is added at this time to promote the separation of the feculent matters contained in the juice; and these being as far as possible removed at a heat just sufficient to cause the impurities to collect together on the surface, the cane-liquor is then subjected to a very rapid boiling, in order to evaporate the watery particles, and bring the syrup to such a consistency that it will granulate on cooling. The quantity of sugar obtainable from a given measure of cane-juice varies according to the season, the soil, the period of the year, and the quality of the canes; but it may be calculated, that taking one state of circumstances with another in these respects, every five gallons, imperial measure, of cane-juice, will yield six pounds of crystallized sugar, and will be obtained from about one hundred and ten well-grown canes.

The fuel used for thus concentrating the juice is furnished by the cane itself, which, after the expressing of that juice, is dried for the purpose by exposure to the sun.

When the sugar is sufficiently cooled in shallow trays, it is put into the hogsheads wherein it is shipped to Europe. These casks have their bottoms pierced with holes, and are placed upright over a large cistern into which the molasses—which is the portion of saccharine matter that will not crystallize—drains away, leaving the raw sugar in the state wherein we see it in our grocers' shops: the casks are then filled up, headed down, and shipped.

With the planters in our own colonies, the process of sugar-making mostly ends with the draining away of the molasses in the manner just mentioned; but in the French Spanish, and Portuguese settlements it is usual to submit this raw sugar to the further process of claying. For this purpose the sugar, as soon as it is cool, is

placed in forms or moulds, similar to those used in the sugar-refineries in England, but much larger; and these being placed with their small ends downwards, the top of the sugar is covered with clay moistened to the consistence of thin paste, the water contained in which gradually soaks through the sugar and washes out a further quantity of molasses, with which it escapes through a hole purposely made at the point of the earthen mould. It is then called clayed sugar: the loaves when removed from the forms are frequently divided into three portions, which, being of different colours and qualities, arising from the greater effect of the water in cleansing the upper portion, are pulverized and packed separately for exportation.

The molasses which have drained from the sugar, together with all the scummings of the coppers, are collected, and, being first fermented, are distilled for the production of rum. The proportionate quantity of this spirit, as compared with the weight of sugar produced, varies considerably with the seasons and management. In favourable years, when the canes are fully ripened and the quality of the sugar is good, the proportion of molasses and scummings is comparatively small; and the manufacture of rum is consequently lessened. A hundredweight of sugar yields five or six gallons of proof spirit.

In the cultivation of the sugar-cane, the principles on which it should be based have almost entirely been overlooked, so that in many districts of the world the sugar-canes are failing on their old grounds. It must, however, be obvious that the same principles which apply to the ordinary produce of the farm and garden must be applicable to them. With this object in view Dr. Stenhouse has lately analyzed the stalks of the sugar-cane for the purpose of ascertaining their composition. From his experiments he came to the conclusion that for the successful cultivation of the sugar-cane it requires to be furnished with a very large quantity of silicate of potash, and also with a considerable amount of fine phosphate. "In fact," says Dr. Stenhouse, "there are few of our

cultivated plants, except perhaps wheat, barley, and other Cerealia, which require so large an amount of these substances: It is not wonderful, therefore, that the cultivation of the sugar-cane, from the inconsiderate way in which it has hitherto been too often conducted, should have been found rapidly to deteriorate, and in the course of time to exhaust most ordinary soils. I apprehend, however, that this exhaustion of the soil by the cultivation of the sugar-cane is by no means an unavoidable result; and that by means of suitable arrangements successive crops of sugar might be raised without the soils being materially injured. Wheat or any other kind of grain necessarily causes the removal of a portion of the valuable inorganic constituents of the soil, such as the alkalis, phosphates, &c., which can only be returned to it indirectly; but with sugar the case is quite otherwise. Sugar is a purely organic substance, consisting of carbon and the elements of water, all of which can be derived from the atmosphere, and contains neither alkalis nor phosphates; so that if the ashes of the canes were carefully collected, and returned to the soil in an available state, I do not see why cane-crops might not be grown upon the same land almost indefinitely." Dr. Stenhouse proposes to do this by burning the canes in an open fire at a much lower temperature than the fires used for evaporating the syrup in the manufacture of sugar, and for which purpose the canes are generally used, and to employ the ashes as a manure. He recommends also a small quantity of guano to be employed, but not mixed with the cane-ashes. The slag from the furnaces also may be powdered, and mixed with carbonate of soda, and exposed to a great heat in a reverberatory furnace.

CHAPTER, XV.

SUGAR FROM BEET-ROOT, MAPLE, AND BIRCH.

SUGAR may be properly reckoned a necessary of life. It is of almost universal use throughout the world. The scattered tribes of North American Indians spend the months of spring in their rude encampments, manufacturing sugar out of the juice of the maple; the five-and-twenty million inhabitants of the United Kingdom employ, throughout the year, two hundred thousand tons of shipping to export five hundred million pounds of sugar from their colonies. This enormous supply affords, upon an average, twenty pounds of sugar to each individual of our twenty-five millions of population. Through the natural operation of our commercial power this important article of comfort is placed within the reach of the humblest in the land, although the revenue received by the state from the consumers amounts to 5,000,000*l.* annually. In France, on the contrary, where the Government has chosen to force the manufacture of sugar at home, the article is consumed only by the wealthy in large towns, and is quite beyond the reach of the labouring population, although it is entirely freed from all duty. The history of beet-root sugar forms one of the most instructive chapters in the history of the evils resulting to a nation from what is called "the protection" of particular interests by a Government.

The celebrated Prussian chemist Margraff, about the year 1747, discovered the existence of a certain portion of sugar in the beet. This discovery was communicated to the Scientific Society of Berlin; but no attempt was made to carry the principle of the discovery into practice. Forty years after this, Achard, another Prussian chemist, resumed the experiments which Margraff had

commenced. This man was somewhat of a visionary ; and he was so enraptured by the prospects which his labours opened to him, that he announced the beet-root as " one of the most bountiful gifts which the Divine munificence has awarded to man upon the earth ;" affirming that not only sugar could be produced from beet-root, but also tobacco, molasses, coffee, rum, arrack, vinegar, and beer. Here, then, was clearly nothing for Europe to do but to apply itself to the cultivation of beet, and leave the West Indies to be covered once more with jungle. The Institute of Paris, however, did not sympathise with the enthusiasm of Achard ; for in 1800 a committee of that body, having gone through a series of the most careful experiments, reported that the results were so unsatisfactory, that it would be unwise to establish any manufacture of sugar from beet.

Here, probably, the matter would have rested, and Europe would have continued wholly to receive its sugar from countries adapted to the growth of the sugar-cane, had not the decrees of Bonaparte, in 1800, excluded France from purchasing the produce of the West Indies. To a large number of the French, sugar was an article of the first necessity ; and the public dissatisfaction at the Milan decrees was therefore excessive. The emperor directed his active mind to the best method of obviating the inconvenience which his political schemes had imposed upon his people. Manufactories of syrups from raisins and honey were established ; but sugar, or a crystallized saccharine substance, could not be procured. M. Deyeux, a member of the committee appointed by Napoleon to consider how the wants of the people could be supplied without foreign commerce, once more turned his attention to the beet-root. His experiments were more satisfactory than those of the committee of 1800 ; probably because the necessity of producing sugar at home was more pressing. An imperial manufactory of sugar was forthwith established at Rambouillet ; imperial schools were instituted for instructing pupils in the process ; premiums were given for the best samples of sugar ; and thus, by 1812, the manufacture of beet-root-sugar

might be considered prosperously set on foot. The profits of the manufacturers were so large, that in one year they were reckoned sufficient to cover all the expenses of the original establishment. There was no competition. Of course there enormous profits were paid by the consumer. The French obtained some sugar, but they paid an extravagant price for the luxury. In 1814 Europe was at peace; the ports of France were again open to the produce of the West Indies; and in a moment the foreign sugar swept the beet-root manufacture entirely away. The consumers once more had cheap sugar; and the Government had not then made the discovery that it would be a good thing to compel them to eat dear sugar, that the manufacturers of beet-root sugar might be kept in activity.

This cheapness was a natural and healthy state of things, which would be sure to provoke the meddling propensities of that class of rulers who can never believe that the interests of trade can take care of themselves. Immediately after the peace, sugar from the French, English, and American colonies was permitted to enter France at the same rate of duty. In a few months, however, it was found that the sugars from the English colonies were driving the sugars of Martinique, Guadaloupe, and Bourbon out of the market. The colonies *must* be protected; so a protecting duty of twenty francs the 100 kilogrammes* was imposed upon all sugars of foreign origin. In 1816 the duty on foreign raw sugar was increased to forty-five francs; in 1820 to seventy-five francs; and in 1822 to ninety-five francs, the 100 kilogrammes. The law of 1816 was the first bounty to the beet-root sugar manufacturers, and they accordingly once more began to be active. But when the duty of 1822 upon foreign sugar amounted to a prohibition, their prosperity was certain. They were enabled to tax the consumer to the amount of the prohibition. The beet-root

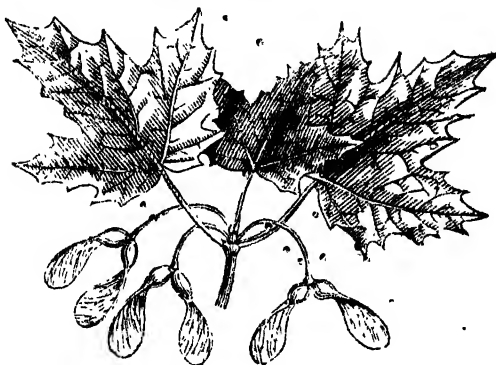
* A kilogramme is equivalent to 2 lbs. 2 oz. 4 dr. 16 gr. English avoirdupois. . .

sugar pays no duty whatever. In 1829 there were 101 manufactories of this sugar in employment, which produced five millions of kilogrammes in the year, or about one-sixteenth part of the whole consumption of sugar in France. That the people of France are the sufferers by this miserable policy is sufficiently evident, from the fact that their average yearly consumption does not exceed four pounds of sugar per head: in the United Kingdom it is twenty pounds per head.

Upon the national advantage of that commercial policy which has given rise to the manufacture of beet-root sugar in France, and which may probably extend the system to Germany and Russia, we have much pleasure in extracting the following sensible observations from a valuable periodical work:—

“The history of this manufacture in France is an illustration, we apprehend, not of the natural progress of industry and of the arts, but of the effects of a system which counteracts the natural progress of both. Whatever may be the ultimate state of this singular manufacture, in consequence of mechanical and chemical improvements yet unknown to us, it is now only supported by a system of commercial and financial policy, which it is for the interest of all countries to see proscribed in Europe. The people of France were the first to be taught by their own philosophers those principles of mutual intercourse which form the basis of trade. Nearly a hundred years have elapsed since Quesnay and his followers taught his countrymen that freedom of intercourse is the soul of commerce. But his countrymen have yet to learn that liberty is as necessary to the health of commerce as to the well-being of the citizen; that trade is but an interchange of things produced, and that if France will not take the productions of other countries, other countries will not and cannot take the productions of France. The cultivation of the beet is but one ramification of that system of repulsion and exclusion which has been adopted in France, to the oppression of her domestic industry, the ruin of her foreign commerce, and

the maintenance of false principles in the commercial policy of surrounding countries."*



Sugar-Maple (*Acer saccharum*).

The SUGAR-MAPLE grows plentifully in the United States; and from the sap of it the inhabitants make sugar, which, though inferior both in the grain and in strength to that which is produced by the cane, granulates better than that of the beet-root, or any other vegetable, the cane excepted. The sugar-maple is a smaller tree than the maple of this country; and it is not much in repute as timber, although from its abundance it is a good deal used in America,—the wood for domestic purposes, and the bark as a blue dye, and as an ingredient in the manufacture of ink.

February, March, or April, according to the state of the season, is the time when the maple is tapped for the preparation of sugar. A perforation is made by an auger, about two inches into the tree, slanting upwards; into this a cane or wooden pipe is inserted, and a vessel placed to receive the sap. The quantity afforded by a

tree varies both with the tree and the season ; the most favourable season being when there is the greatest difference between the heat of the day and that of the night. From two to three gallons may be about the daily average afforded by a single tree ; but some trees have yielded more than twenty gallons in a day, and others not above a pint. The process by which maple-juice is boiled and clarified into sugar does not differ materially from that used for cane-juice in the West Indies. The juice should be as recently drawn as possible ; for if it stand more than twenty-four hours, it is apt to undergo the vinous and the acetous fermentation ; by which processes, the saccharine quality of the juice being destroyed, sugar can no longer be extracted. From the quantity of saccharine matter in the juice of this maple, there is no doubt that it could be fermented into wine, and that a spirit could be distilled from it. There is saccharine matter in the sap of the common maple, but it does not granulate well, and would not repay the expense of extraction.

BIRCH (*Betula alba*). The sap of this tree in the earlier spring months contains sugar. By tapping the tree, or breaking off one of the branches, the sap drops out, and may be easily collected. It does not contain a sufficient quantity of sugar to repay the trouble of concentration ; there is, however, enough to allow of the vinous fermentation, which when properly conducted forms an agreeable effervescent beverage known by the name of birch-wine.

Sugar may be manufactured from the stalks of many of the Cerealia, and in America this is actually carried on to a great extent with the maize. (See vol. i. of this work, p. 112.)

CHAPTER XVI.

FRUITS CONTAINING SUGAR :—FIG AND VINE.

WE shall here refer to those fruits which contain sugar as a distinguishing ingredient. Almost all fruits brought to table in a mature state contain more or less sugar, but this is combined with acids and other peculiar secretions, for which they are consumed rather than for the sugar they contain.



The Fig (*Ficus carica*).

The FIG (*Ficus carica*).—The traditions of the Greeks carried the origin of the fig back to the remotest antiquity. It was probably known to the people of the East before the *Cerealia* (wheat, barley, &c.), and stood in the same relation to men living in the primitive condition of society as the banana does to the Indian tribes of South America at the present day. With little trouble of cultivation it supplied their principal necessities, and offered, not an article of occasional luxury, but of constant food, whether in a fresh or a dried state. As we

proceed to a more advanced period of the history of the species, we still find the fig an object of general attention. The want of blossom on the fig-tree was considered as one of the most grievous calamities by the Jews. Cakes of figs were included in the presents of provisions by which the widow of Nabal appeased the wrath of David.* In Greece, when Lycurgus decreed that the Spartan men should dine in a common hall, flour, wine, cheese, and figs were the principal contributions of each individual to the general stock. The Athenians considered figs an article of such necessity that their exportation from Attica was prohibited. Either the temptation to evade this law must have been great, or it must have been disliked; for the name which distinguished those who informed against the violators of the law, *συκοφανται* (from *συκον*, a fig, and *φαινω*, to show), became a name of reproach, from which we obtain our word sycophant. As used by our older writers, sycophant means a *tale-bearer*; and the French employ the word to designate a liar and impostor generally,—not a flatterer merely. At Rome the fig was carried next to the vine in the processions in honour of Bacchus, as the patron of plenty and joy; and Bacchus was supposed to have derived his corpulency and vigour, not from the vine, but from the fig. All these circumstances indicate that the fig contributed very largely to the support of man; and we may reasonably account for this from the facility with which it is cultivated in climates of moderate temperature. Like the Cerealia, it appears to flourish in a very considerable range of latitude; and even in our own country frequently produces fine fruit, without much difficulty, in the open air. Yet the tree is not generally cultivated except in very favourable situations; and it must belong to more genial climates to realize the ancient description of peace and security, which assigns the possession of these best blessings of Heaven to “every man under his own fig-tree.”

The fig consists of a pulp, containing a number of

* 1 Samuel, chap. xxv., ver. 18.

seed-like pericarps, inclosed in a rind. There is something very singular in the fructification of the *Ficus carica*. It has no visible flower; for the receptacles which afterwards become the fruit arise immediately from the joints of the tree, in the form of little buds, with a perforation at the end, but not opening or showing any thing like petals, or the ordinary parts of fructification. As the fig enlarges, the little flower inside the receptacle comes to maturity in its concealment; and in the eastern countries the fruit is improved by a singular operation known by the name of *caprification*. This is performed by suspending by threads, above the cultivated figs, branches of the wild fig, which are full of a species of cynips. When the insect has become winged, it quits the wild figs and penetrates the cultivated ones, for the purpose of laying its eggs; and by this process it ensures the fructification by dispersing the pollen, and afterwards hastens the ripening by puncturing the pulp, and causing a dispersion or circulation of the nutritious juices. In France this operation is imitated by inserting straws dipped in olive oil.

The double, and in some climates the triple, crop of the fig-tree, is one of the most curious circumstances belonging to its natural history, and further illustrates the value attached to it in the countries of the East. It offers the people fruit through a considerable portion of the year. The first ripe figs, according to Dr. Shaw, are called *boccôre*, and come to maturity about the latter end of June; though, like other trees, they yield a few ripe before the full season. These few are probably of inferior value; for the prophet Hosea says, "I found Israel like grapes in the wilderness; I saw your fathers as the first-ripe in the fig-tree at her first time." When the *boccôre* draws near to perfection, the *karmouse*, or summer fig, begins to be formed. This is the crop which is dried. When the *karmouse* ripens, in Syria and Barbary, there appears a third crop, which often hangs and ripens upon the tree after the leaves are shed.

The time of gathering the summer fig in the Levant, with its corresponding process of drying and packing for

the European market, is one of considerable bustle and activity. The principal seat of this commerce is Smyrna.

The import of figs to Great Britain alone, which is principally from Turkey, amounts to nine hundred tons annually, subject to a duty of 1*l.* 1*s.* per cwt. Dry figs form also a very considerable article of commerce in Provence, Italy, and Spain; besides affording, as in the East, a chief article of sustenance to the native population. In Spain the principal exports of dried figs are from the provinces of Andalusia and Valencia; though the fruit grows, more or less, in every province.* In the northern parts of France there are many fig-gardens, particularly at Arpenteuil.

It is probable that if the fresh fig were much esteemed by the people of this country, the tree would be more extensively cultivated here in favourable situations, such as our southern coast. But it would seem, from our old writers, and indeed from a common expression even of the present day, that, from some association of ideas, the fig was an object of contempt. "*Figo* for thy friendship," says Pistol.† We have, however, old trees still remaining in some gardens, which bear good crops. These are generally trained against walls; but fig-trees have also been planted as standards here with success. We shall mention a few instances of each case.

The fig-tree is said to have been first brought into England in 1525, by Cardinal Pole; though probably it was introduced before, both by the Romans and the monks. The specimens came from Italy, and are still in the archbishop's gardens at Lambeth: they are of the white Marseilles kind, and bear excellent fruit. In the course of their long existence, they have attained a size far exceeding the standard fig-tree in its native situation. They cover a space of fifty feet in height, and forty in breadth: the trunk of the one is twenty-eight, and the other twenty-one inches in circumference. In the severe winter of 1813-14 those venerable trees were

* Laborde's 'View of Spain,' vol. iv. † 'Henry V'

greatly injured; and, in consequence of the injury, it was found necessary to cut the principal stems down nearly to the ground; but the vegetative powers of the roots remained unimpaired, and they are shooting up with great vigour.

In the garden of the manor-house at Mitcham, which was formerly the private estate of Archbishop Cranmer, there was another fig-tree of the same sort, which is generally understood to have been planted by that prelate. It was low, compared with the trees at Lambeth, but had a thicker stem: it was destroyed some time before the close of the last century.

Another celebrated fig-tree was in the Dean's garden at Winchester: it bore a small red fig, and was in a healthy state in the year 1757. It was inclosed in a wooden frame, which had a glass door, with two windows on each side, by which the sun and air were admitted, while the frame protected it from the wind and rain. On the stone wall to which the tree was nailed there were several inscriptions; and, among the rest, one which mentioned that, in the year 1623, King James I. "tasted the fruit of this tree with great pleasure." That tree also has been destroyed.

A few years since there was a fine old fig-tree at the back of a house in King Street, Covent Garden. The trunk has now been cut down to build a wall where it grew: but shoots are springing up from the root. This tree was doubtless one of the *Content Garden*, which, in the reign of Elizabeth, bounded the Strand on the north, extending from St. Martin's Lane to Drury Lane, these two lanes being the only approaches to the neighbouring village of St. Giles.

The *Pocock Fig-tree* is one of the most celebrated in this country, and was once supposed to have been the first of the white Marseilles figs introduced into England. The tradition is, that it was brought from Aleppo by Dr. Pococke, the celebrated traveller, and planted in the garden of the Regius Professor of Hebrew at Christ Church, Oxford, in the year 1648. An extract from a communication by Mr. William Baxter, curator of the

Botanical Garden at Oxford, read before the Horticultural Society in 1819, contains the latest history of this tree. It received considerable damage from the fire that happened at Christ Church on the 3rd of March, 1809; till that time the large trunk mentioned by Dr. John Sibthorpe, in Martyn's edition of Miller's 'Gardener's Dictionary,' remained. In order to preserve it from the injuries of the weather, this trunk had been covered with lead, but at the time of the fire the lead was stolen, and soon after the trunk itself decayed, and was removed. The tree in 1819 was in a very flourishing state. There are some remains of the old trunk to be seen a few inches above the surface of the ground. The branches then growing were not more than eight or ten years old; but those in the middle of the tree were twenty-one feet high.

It is probable that standard fig-trees were formerly much more common in this country than at present. Bradley, an old writer on agriculture, mentions an ancient fig-tree at Windsor, which grew in a gravel-pit, and bore many bushels every year, without any pains being bestowed upon it.

In the fourth volume of the 'Horticultural Transactions' there is a very interesting account, by Mr. Sabine, of some standard fig-trees in the garden of a cottage at Compton, near Worthing, in Sussex. The garden in which they stand slopes gently to the south, is protected on the north by a thick grove of apple and plum trees, and the climate is very mild. "The number of the fig-trees," says Mr. Sabine, "is fourteen; they occupy the principal part of the garden, which is very small, and are in perfect health; their average height is about ten feet, and, if any of the larger ones were detached, they would cover a space of twelve feet in diameter. Their stems are not large: the plants are bushes rather than trees, for the branches spread in all directions from the root. These are propped up by stakes, but many of them are suffered to hang near the ground." Mr. Komard, to whom they belonged, informed Mr. Sabine that though the quantity varied, there always was

a crop; that the figs began to ripen in the end of August, or beginning of September, and continued during October; that the crop was generally from the spring figs, though occasionally a few of the autumn ones ripened; that he manured the ground every autumn, and that he pruned as little as possible.

In the neighbourhood of Worthing, and indeed along nearly all the south-east coast of Sussex, fig-trees are very common in the gardens. At Tarring (about two miles from Worthing) there is a remarkable plantation of figs, called by the inhabitants of that village "The Fig-garden." The trees, which are about eighty in number, grow luxuriantly at intervals of about twelve feet, on the sides of the paths. They are about fifteen feet high, and the stems are from six to eleven inches in diameter. We saw them on the 1st of September, 1829, bearing a most abundant crop. The people to whom the garden belonged knew nothing of the history of these trees, but an old inhabitant of the village told us that he thought they had been planted about forty years.

With the requisite degree of care figs may be readily obtained in this country in a hothouse; but they require a mode of cultivation so peculiar, that if it is wished to procure them in perfection they ought to be cultivated along with no other fruit, and then two or three crops may be gathered.

The VINE (*Vitis vinifera*). The berries of the grape, in addition to sugar, contain tartaric acid, and might be enumerated amongst acid foods, but the principal use of this fruit, the making of wine, entirely depends on the property which the sugar possesses of entering into the vinous fermentation.

Of all the berries, the grape has in every age been held the most in esteem. As is the case with the cerealia, the early history of the vine is involved in obscurity. The cultivation of the grape was, probably, amongst the earliest efforts of husbandry. "And Noah began to be an husbandman, and he planted a vineyard."*



According to the tradition of the Egyptians, Osiris first paid attention to the vine, and instructed other men in the manner of planting and using it. The inhabitants of Africa ascribe the same gift to the ancient Bacehus. We find mention of the fermented juice of the grape as early as that of its cultivation. Wine was among the first oblations to the Divinity. "Melchizedek, King of Salem, brought forth bread and wine, and he was the priest of the Most High God."* We may trace, through all the most ancient records of the human race, a conformity between the chief articles of subsistence and the sacrifices to heaven."

"The vine," says Humboldt, "which we now cultivate, does not belong to Europe; it grows wild on the coasts of the Caspian Sea, in Armenia, and in Carmania. From Asia it passed into Greece, and thence into Sicily. The Phœceans carried it into the south of France; the Romans planted it on the banks of the Rhine. The species of *Vitis*, which are found wild in North America, and which gave the name of the Land of the Vine (*Weinenland*) to the first part of the New Continent which was discovered by Europeans, are very

* Genesis xiv. 18.

different from our *Vitis vinifera*.* It is a popular error that the grape-vine was common to both continents.

It has been said that the vine was introduced into England by the Romans; but if so, it could not have been till near the close of their influence, for Tacitus mentions that it was not known when Agricola commanded in the island. At the invasion of the Anglo-Saxons, however, when the country had been under the Roman dominion four hundred years, and had received, during that long period, all the encouragement which that people gave to the agriculture of their provinces, the vine, without doubt, was extensively cultivated. Vineyards are mentioned in the earliest Saxon charters, as well as gardens and orchards, "and this was before the combating invaders had time or ability to make them, if they had not found them in the island."† In the Cottonian Manuscripts, in the British Museum, there are some rude delineations in a Saxon calendar, which, in the month of February, represent men cutting or pruning trees, some of which resemble vines. King Edgar, in an old grant, gives the vineyard situate at Wecet, together with the vine-dressers. In 'Domesday-Book' vineyards are noticed in several counties. According to William of Malmesbury, who flourished in the first half of the twelfth century, the culture of the vine had in his time arrived at such perfection within the vale of Gloucester, that a sweet and palatable wine, "little inferior to that of France," was made there in abundance. In the thirteenth and fourteenth centuries, almost every large castle and monastery in England had its vineyard. The land on the south side of Windsor Castle, now a pleasant green lawn, running from the town under the castle-wall, was a vineyard, of which a particular account may be seen in the 'Archæologia.' At this period wine was made in England in considerable quantities; and yet the importation of foreign wines was very large. In the year 1272, London imported 3799 tuns;

* Géographie des Plantes, 4to., p. 26.

† Turner's Anglo-Saxons, Appendix to vol. ii. 8vo.

Southampton and Portsmouth, 3147; and Sandwich, 1900.* In the time of Edward III., a trade in Rhenish wine was carried on between Hull and the ports of the Baltic.† The vineyards were, probably, continued till the time of the Reformation, when the ecclesiastical gardens were either neglected or destroyed; and about this period, ale, which had been known in England for many centuries, seems to have superseded the use of wine as a general beverage. This arose from the better cultivation of the country. Under the feudal tenures, when the serfs were often suddenly compelled to follow their lords to battle, husbandry, particularly the growth of grain, was fearfully neglected; and sometimes the most dreadful famines were the result. The prices of wheat occasionally fluctuated from ten shillings to twenty pounds per quarter of modern money. But when just principles of tenancy were established, so that the occupier of the land could be sure of appropriating to himself a fair proportion of the fruit of his labour, agriculture began to flourish. The cultivation of hops was revived or introduced about the end of the fifteenth century. All these circumstances—the decay of the vineyards, the encouragement to the growth of grain, and the culture of hops—gradually tended to supersede the demand for wine, by offering a beverage to the people which was cheaper, and perhaps as exhilarating. Ritson, a celebrated antiquary, has preserved a rude ballad of this period in praise of that beverage which was becoming the national favourite:—

“Bryng us home, no sydyr, nor no palde wyne;
 For au that thou do shalt have Cryst’s curse and mine:
 But bryng us home good ale, and bryng us home good ale,
 And for our der lady’s love bryng us home good ale.”

We understand that on the southern coast of Devonshire, possessing the mildest temperature of the English counties, there are still two or three vineyards, from

* Anderson’s History of Commerce.

† Bymer’s Fœdera.

which wine is commonly made. A vineyard at the castle of Arundel, on the south coast of Sussex, was planted about the early part of the last century, and of the produce there are reported to have been sixty pipes of wine in the cellars of the Duke of Norfolk, in 1763. This wine is said to have resembled Burgundy; but the kind of grape and the mode of culture have not been particularly recorded. Whatever may have been the condition and qualities of the early English grapes employed in making wine, we know that they must have been ripened by the natural temperature of the climate, as artificial heat was not resorted to for the ripening of grapes till the early part of the last century; and then the heat was applied merely to the other side of the wall on which the vines were trained: nor is it till about the middle of the same century that we have any account of vines being covered with glass. Professor Martyn is an advocate for the renewal of grape culture in this country for wine. For that purpose he recommends that the vines should be trained very near the ground, he having found that, by this method of training, the berries were much increased in size, and also ripened earlier. The same method is pursued in the northern part of France, where it is found to be successful.

The culture of the grape, as an article of husbandry, extends over a zone about two thousand miles in breadth, that is, from about the twenty-first to the fiftieth degree of north latitude; and reaching in length from the western shores of Portugal, at least to the centre of Persia, and probably to near the sources of the Oxus and the Indus. Farther north than that, it does not ripen so as to be fit for the making of wine; and farther south, it seems to be as much injured by the excessive heat. The best wines are made about the centre of the zone; the wines towards the north being harsh and austere, and the grapes towards the south being better adapted for drying and preserving as raisins. Thus, in Spain, while the wine of Xeres, in the Sierra Morena (the real Sherry), is an excellent wine, and while that of the ridge of Apulxarras, in Granada, is very tolerable, the

grapes of the warm shores about Malaga, and in Valencia, are chiefly fit only for raisins. So, also, while the slopes of Etna, and those of the mountains in Greece, furnish some choice vines, the grapes upon the low shores in those countries have also to be dried. It should seem, that the grapes are always the higher flavoured and the more vinous, the greater the natural temperature under which they are ripened, but that an extreme heat throws the juice into the acetous fermentation before the vinous one has time to be matured. We have an analogous case in the fermentation of malt liquors in this country, which cannot be properly performed in the warm months.

About eight thousand tons of raisins, or dried grapes, are annually imported into England, at a duty of about £160,000. A considerable quantity of undried grapes are also imported, principally from Portugal, in jars, among sawdust. The annual value of those so imported is about £10,000. The *currants* of commerce, which are so extensively used in England, and of which about six thousand tons are annually imported into this country, are small dried grapes, principally grown in the Ionian Islands.

Laborde, in his account of Spain, gives the following description of the mode of drying raisins:—"In the kingdom of Valencia they make a kind of ley with the ashes of rosemary and vine branches, to which they add a quart of slaked lime. This ley is heated, and a vessel, full of holes, containing the grapes, is put into it. When the bunches are in the state desired, they are generally carried to naked rocks, where they are spread on beds of the field artemisia, and are turned every two or three days till they are dry. In the kingdom of Granada, particularly towards Malaga, they are simply dried in the sun, without any other preparation. The former have a more pleasing rind, but a less mellow substance; the skins of the latter are not so sugary, but their substance has a much greater relish; therefore, the raisins of Malaga are preferred by foreigners, and are sold at a higher price: to this their quality may likewise

contribute; they are naturally larger and more delicate than those of the kingdom of Valencia."

A vineyard, associated as it is with all our ideas of beauty and plenty, is, in general, a disappointing object. The hop-plantations of our own country are far more picturesque. In France, the vines are trained upon poles, seldom more than three or four feet in height; and "the pole-clipt vineyard" of poetry is not the most inviting of real objects. In Spain, poles for supporting vines are not used; but cuttings are planted, which are not permitted to grow very high, but gradually form thick and stout stocks. In Switzerland, and in the German provinces, the vineyards are as formal as those of France. But in Italy is found the true vine of poetry, "surrounding the stone cottage with its girdle, flinging its pliant and luxuriant branches over the rustic veranda, or twining its long garland from tree to tree."* It was the luxuriance and the beauty of her vines and her olives that tempted the rude people of the North to pour down upon her fertile fields:—

"The prostrate South to the destroyer yields
Her boasted titles and her golden fields;
With grim delight the brood of winter view
A brighter day, and heavens of azure hue,
Scent the new fragrance of the breathing rose,
And quaff the pendant vintage as it grows."†

In Greece, too, as well as Italy, the shoots of the vines are either trained upon trees, or supported, so as to display all their luxuriance, upon a series of props. This was the custom of the ancient vine-growers; and their descendants have preserved it in all its picturesque originality.‡ The vine-dressers of Persia train their vines to run up a wall, and curl over on the top. But the most luxurious cultivation of the vine in hot countries is where it covers the trellis-work which surrounds a

* The Alpenstock, by C. J. Latrobe, 1829.

† Gray's Alliance of Education and Government.

‡ See the second Georgic of Virgil.

well, inviting the owner and his family to gather beneath its shade. "The fruitful bough by a well" is of the highest antiquity.

The vine lasts to a considerable age; it spreads also to a large extent, or, when supported, rises to a great height. Although it bears at three or four years plentifully, it is said that vineyards improve in quality till they are fifty years old.* Pliny mentions a vine which had attained the age of six hundred years. In France and Italy there are entire vineyards still in existence, and in full bearing, which were in the same condition at least three centuries ago, and have so continued ever since. The slender stems of ordinary vines, when they have attained a considerable age, are remarkably tough and compact; and the timber of the very old ones in foreign countries, which is occasionally of size enough for being sawn into planks, and being made into furniture and utensils, is almost indestructible. Strabo mentions an old vine which two men could not embrace. A single vine-plant, which was trained against a row of houses at Northallerton, covered, in 1785, one hundred and thirty-seven square yards. It was then about a hundred years old, and it increased in size afterwards; but it is now dead. In 1785 the principal stem of this vine was about fifteen inches in diameter.

Of the variety of the vine called the black Hamburg there are several remarkable trees in England, covering a great extent of surface, and bearing (under glass) a profusion of the finest fruit. Of these, among the most celebrated are the Hampton Court vine, and the vine at Valentines, in Essex. The Hampton Court vine is in a grape-house on the north side of the palace: it covers a surface of twenty-two feet by seventy-two, or 1694 square feet. It is a most productive bearer, having seldom fewer than two thousand clusters upon it every season. In the year 1816 there were at least 2240, weighing each, on the average, a pound; so that the whole crop weighed a ton, and merely as an article of

* Miller.

commerce was worth upwards of £400. The Valentines vine extends over a greater surface and has a larger trunk than that at Hampton Court; but it is not on the average of seasons so productive. It has, however, been known to produce two thousand bunches of a pound each.

CHAPTER XVII.

THE DATE—PLANTAIN—BANANA, &c.



THE DATE (*Phoenix dactylifera*). The date is one of those plants which, in the countries that are congenial to their growth, form the principal subsistence of man; and its locality is so peculiar that it cannot, strictly speaking, be classed either with the fruits of temperate or with those of tropical climates. It holds a certain intermediate place; and is most abundant in regions where there are few other esculent vegetables to be found.

There is one district where, in consequence of the extreme aridity of the soil, and the want of moisture in the air, none of the Cerealia will grow: that district is

the margin of the mighty desert which extends, with but few interruptions, from the shores of the Atlantic to the confines of Persia, an extent of nearly four thousand miles. The shores, the banks of the rivers, and every part of this region in which there is humidity, are exceedingly fertile; and with but unskilful culture produce the most abundant crops and the choicest fruits. But along the verge of the desert, and in the smaller oases or isles which here and there spot that wilderness of sand, the date-palm is the only vegetable upon which man can subsist. The lofty summits of the mountains of Atlas form an effectual barrier to the humid winds from the sea. Accordingly, the richer vegetation extends only as far to the south of them as the courses of the streams that are fed by the mountain snows; and these streams are soon evaporated by the air, or absorbed by the thirsty soil. The more lowly vegetables on that soil are chiefly of a saline and succulent description, such as euphorbias, salsolas, and cactuses, which retain their own humidity in consequence of their smooth and close rinds, without much aid from external moisture; but their juices are in general too acrid, or too much impregnated with soda, for being of any use as food. Over these the date-palm raises its trunk and spreads its leaves, and is the sole vegetable monarch of the thirsty land. It is so abundant, and so unmixed with anything else that can be considered as a tree in the country between the states of Barbary and the desert, that this region is designated as the Land of Dates (Biledulgerid); and upon the last plain, as the desert is approached, the only objects that break the dull outline of the landscape are the date-palm and the tent of the Arab. The same tree accompanies the margin of the desert in all its sinuosities; in Tripoli, in Barca, along the valley of the Nile, in the north of Arabia, and in the south-east of Turkey.

This region of the date has perhaps remained for a longer period unchanged in its inhabitants and its productions than any other portion of the world. The Ish-

maelites, as described in Scripture history, were but little different from the Bedouins of the present time; and the palm-tree (which in ancient history invariably means the date) was of the same use, and held in the same esteem, as it is now. When the sacred writers wished to describe the majesty and the beauty of rectitude, they appealed to the palm as the fittest emblem which they could select. "He shall grow up and flourish like the palm-tree," is the promise which the Royal Poet of Israel makes for the just.

Even among the followers of other faiths, the palm has always been the symbol held in the greatest veneration. It is recorded of Mahomet that, like the Psalmist, he was accustomed to compare the virtuous and generous man to the date-tree: "He stands erect before his Lord; in every action he follows the impulse received from above; and his whole life is devoted to the welfare of his fellow-creatures." The inhabitants of Medina, who possess the most extensive plantations of date-trees, say that their prophet caused a tree at once to spring from the kernel at his command, and to stand before his admiring followers in mature fruitfulness and beauty.* The Tamanaquas of South America have a tradition that the human race sprung again from the fruits of the palm, after the Mexican *age of water*. The usefulness of the tree has thus caused it to be the subject of universal veneration. In ancient times, and in modern, the palm has been the symbol of triumph. The Jews carry it on a solemn festival in commemoration of their fathers having gained possession of the Promised Land;† and the Christians in remembrance of that more glorious victory, when the Saviour rode into Jerusalem amid the jubilations and hosannas of the people.

And the tree is not unworthy of those honours which mankind have in all ages bestowed upon it. Indeed,

* Burekhardt's Arabia.

† Judaea was typified by the palm-tree upon coins of Vespasian and Titus.

the worthiness of the tree must have been the cause of those honours. Rearing its stem, and expanding its broad and beautiful shade where there is nothing else to shelter man from the burning rays of the sun, the palm-tree is hailed by the wanderer in the desert with more pleasure than he hails any other tree in any other situation. Nor is it for its shade alone, or even for its fruit, that the palm is so desirable in that country; for, wherever a little clump of palms contrast their bright green with the red wilderness around, the traveller may in general be sure that he shall find a fountain ready to afford him its cooling water.

Nor is it only when standing alone in the desert that the palm is a majestic tree. Palms form the shade and the beauty of many of the tropical forests. Some of them are among the tallest of trees; and when the margin of a river is spoken of as more than usually delightful, we allude to its "palmy side."

The *Cucurito*, a palm of South America, throws out its magnificent leaves over a trunk a hundred feet high. This family of plants diminish in grandeur and beauty as they advance towards the temperate zone; and Humboldt says that those who have only travelled in the north of Africa, in Sicily, and in Murcia, cannot conceive how the palms should be the most imposing in their forms of all the trees of the forest. The palms of South America furnish food in a variety of ways to the people; so that in those wild districts, the assertion of Linnæus forces itself upon the mind—that the region of palms was the first country of the human race, and that man is essentially *palmivorous*.

The date-palm, though some of the family are more majestic, is still a beautiful tree. Its stem shoots up, in one cylindrical column, to the height of fifty or sixty feet, without branch or division, and of the same thickness throughout its whole length. When it attains this height, its diameter is from a foot to eighteen inches. From the summit of this majestic trunk it throws out a magnificent crown of leaves, which are equally graceful in their formation and their arrangement.

"Those groups of lovely date-trees bending
Languidly their leaf-crowned heads,
Like youthful maids, when sleep descending
Warns them to their silken beds."*

The main stems of the leaves are from eight to twelve feet long, firm, shining and tapering; and each embraces, at its insertion, a considerable part of the trunk. The trunk of the palm is, in fact, made up of the remains of leaves, the ends of which are prominent just under the crown, but more obliterated towards the root of the tree. The bottoms of the leaves are enveloped in membranous sheaths, or fringed with very tough fibrous matter. These leaves are pinnated, or in the form of feathers, each leaf being composed of a great number of long, narrow leaflets, which are alternate, and of a bright lively green. Near the base of the leaf, these leaflets are often three feet long; but even then they are not one inch in breadth; neither do they open flat, but remain with a ridge in the middle, something like the keel of a boat. When the leaves are young they are twisted together, and matted up with loose fibres, which open and disperse as the leaf expands. The young leaflet is also armed at the extremity with a hard black spine, or thorn. They are more stiff and firm than the leaves of any other tree.

The trunk of the palm, though it is in some parts remarkably hard and durable, can hardly be considered as timber. It consists of longitudinal fibres, which are not so much interwoven as those of the branching trees; but have their interstices filled with a sort of pith, or medullary substance, when young, that is near the top, where the young leaves are in the progress of formation. This medullary substance contains sap; but in the older portions of the tree it consolidates, though it always remains granular, and, as is the case with the pith of trees, is as easily divided across as longitudinally. Generally speaking, the medullary part of the palm is much lighter in colour than the fibrous part; and thus

* Moore.

well-consolidated palm-trunks have a beautifully mottled appearance when cut across. The wood of the areca palm, or cabbage-palm of South America, is sometimes used in ornamental furniture, under the name of cabbage-wood; but it does not answer very well, as the ends of the fibres are too hard, and the medullary matter too soft, for holding glue. For the same reason, the surface is very difficult to polish, and cannot be preserved without varnish.

The flowers come out in large bunches, or spikes, from between the leaves; they are at first inclosed in a spathe, or sheath, which opens to let them expand, and then shrivels and withers.

The date-palm is a dioecious tree, having the male flowers in one plant, and the female, or fruiting ones, in another. The male flowers are considerably larger than the female; and the latter have in their centre the ovaries, which are the rudiments of the dates, about the size of small peas.

The two distinct sexes of the date-tree appear to have been known from the remotest antiquity, as they are noticed by all the ancients who describe the tree. It is not a little remarkable that there is a difference in the fructification of the wild date and the cultivated, though both are precisely the same species. Wild dates impregnate themselves; but the cultivated ones do not, without the assistance of art. Theophrastus and Pliny mention this fact; and in every plantation of cultivated dates, one part of the labour of the cultivator consists in collecting the flowers of the male date, climbing to the top of the female with them, and dispersing the pollen on the germs of the dates. So essential is this operation, that though the male and female trees are growing in the same plantation, the crop fails if it be not performed. A very remarkable instance of this is related by Delile, in his Egyptian Flora. The date-trees in the neighbourhood of Cairo did not yield a crop in the year 1800. The French and Turkish troops having been fighting all over the country in the spring, field labour of every kind was suspended, and amongst the rest, the fecunda-

tion of the date. The female date-trees put forth their bunches of flowers as usual, but not one of them ripened into edible fruit. The pollen of the male trees appears to have been scattered over the country by the winds; and, as it had not been sufficiently abundant for reaching the germs so as to ensure fructification, an almost universal failure was the consequence. The Persians, according to the elder Michaux, who travelled in the country, were more provident than the Egyptians. In a civil war, which was attended with all the ruinous effects of anarchy, the male date-trees of a whole province were cut down by the invading troops, that the fructification of this necessary of life might be stopped. But the inhabitants, apprehending such a result, had been careful previously to gather the pollen, which they preserved in close vessels; and thus they were enabled to impregnate their trees when the country was freed from the destroying army. It is said that the pollen had thus preserved its powers during nineteen years.*

Pontanus, an Italian poet of the fifteenth century, gives a glowing description of a female date-tree, which had stood lonely and barren, near Otranto, in Italy, until a favouring wind wafted toward it the pollen of a male that grew at a distance of fifteen leagues. Father Labat, in his account of America, relates a story of a date-tree in the island of Martinico. There were palm-trees of various other kinds in the island, but there was only one date-tree, which grew near a convent. That tree produced fruit which was grateful enough to the taste; but when an increase of the number of the date-trees was wanted, not a single one would grow from the seed; and thus, after a number of unsuccessful trials, they were obliged to send to Africa for dates, the stones of which grew readily, and produced abundantly.

Four or five months after the operation of fecundation has been performed, the dates begin to swell; and when they have attained nearly their full size, they are carefully tied to the base of the leaves, to prevent them

* *Annales du Muséum.*

from being beaten and bruised by the wind. If meant to be preserved, they are gathered a little before they are ripe; but when they are intended to be eaten fresh, they are allowed to ripen perfectly, in which state they are a very refreshing and agreeable fruit. Ripe dates cannot, however, be kept any length of time, or conveyed to any very great distance, without fermenting and becoming acid; and therefore those which are intended for storing up, or for being carried to a distant market, are dried in the sun upon mats. The dates which come to the European market from the Levant and Barbary are in this state; and the travellers in the desert often carry with them a little bag of dried dates, as their only or their chief subsistence during journeys of many hundred miles. In parts of the East, the dates that fall from the cultivated trees are left on the ground for the refreshment of the wayfaring man.

In the Hedjaz, the new fruit, called *rutab*, comes in at the end of June, and lasts two months. The harvest of dates is expected with as much anxiety, and attended with as general rejoicing, as the vintage of the south of Europe. The crop sometimes fails, or is destroyed by locusts, and then a universal gloom overspreads the population. The people do not depend upon the new fruit alone; but during the ten months of the year when no ripe dates can be procured, their principal subsistence is the date-paste, called *adjoue*, which is prepared by pressing the fruit, when fully matured, into large baskets. "What is the price of dates at Mekka or Medina?" is always the first question asked by a Bedouin who meets a passenger on the road.*

There is, indeed, hardly any part of the tree which is not serviceable to man, either as a necessary or a luxury. When the fruit is completely ripened, it will, by strong pressure, yield a delicious syrup, which serves for preserving dates and other fruits; or the fruit may be made into jellies and tarts. The stalks of the bunches of dates, hard as they are in their natural state, as well

as the kernels, are softened by boiling, and in that condition are used for feeding cattle. Dates, with the addition of water, afford by distillation a very good ardent spirit, which, as it does not come within the prohibition of the Koran against wine, is much used in some of the Mohammedan countries, and answers the same purpose of false excitement as the brandy or the malt spirits of other nations. Palm-wine is also made from the date: this is also without the statute of the Prophet. It is known in Egypt by the name of *lakhlsy*. It is the sap or juice of the tree, and can only be obtained by its destruction; so that such trees only as are unproductive are selected for obtaining it. The time chosen for this purpose is when the tree is in the most active state of vegetation. The crown is then cut off, and a cavity scooped in the top of the trunk. As the sap rises, it exudes into this cavity, at the rate of nearly a gallon a day, for the first two weeks; after which it gradually diminishes; and at the end of six weeks or two months it stops entirely, and the tree, which has become by the operation completely dry, is cut down for fire-wood, or for any other of the purposes to which the trunk of the palm is applied. When the juice first exudes from the tree, it is remarkably sweet, but it soon ferments and becomes vinous, with a certain degree of acidity. This juice may also be distilled into an ardent spirit; in fact, the genuine arrack, or rack, of the East is obtained from the juice of palms. In Egypt and Arabia the date-trees that have become unproductive, through age or any other circumstance, are commonly disposed of in this manner. What is called the *cabbage* of the palm is esculent in many of the species, and in the date among others. The cabbage is a conical tuft in the centre of the crown of leaves, and is formed of the future leaves in their undeveloped state. When the outside is removed, this part of the date-tree tastes very much like a fresh chesnut; but, like the palm-juice, it is costly, being obtained only by the destruction of the tree; and therefore it is not used except in those trees which are cut for the sake of the sap or juice.

The fibrous parts of the date-tree are made into ropes, baskets, mats, and various other articles of domestic use; and so are the strings or stalks that bear the dates. The cordage of the ships navigating the Red Sea is made almost exclusively of the inner fibrous bark of the date-tree. The trunk answers very well for posts, railings, and other coarse purposes; but it is not fit for being worked into planks, as the fibrous nature of it makes it easily split lengthwise into threads. The medullary part is much more abundant and soft towards the centre of the tree than towards the circumference; and, therefore, when it is to be used as timber, the trunk is generally cleft in two down the middle, for the purpose of allowing the heart to dry and harden.

The medullary part of the date-tree is partly farinaceous, and soluble in water; and a nutritious substance may be obtained from it, resembling in consistency the *sago* which is obtained from another kind of palm. In the proper date-tree, however, it is small in quantity, and by no means good in quality. From another, and a much smaller species (*Phoenix farinifera*), which is a native of the East Indies, the supply is much more abundant. This farinaceous date-tree grows upon the dry and sandy parts of the east or Coromandel coast of the peninsula of Hindostan. It is a very low tree, or rather a great leafy bush; for the trunk is never above a foot and a half or two feet in height, and the leaves completely conceal it. This palm is of a much deeper green, and has the leaves much narrower, than those of the date. It fruits and flowers nearly in the same manner. The berries are about the size of kidney-beans, and of a shining black; they have not much pulp, but what they have is sweet and mealy. In times of scarcity the natives of Hindostan have recourse to the wood of this palm for food. When the stem is divested of the leaves, and of the brown fibrous matter with which their roots are enveloped, it is about eighteen inches long, and six in diameter where thickest. The outside of it consists of woody fibres of a white colour, and very much matted together, and within these the farinaceous matter

is contained. To obtain that, the natives split the trunk into longitudinal pieces, dry them, beat them in mortars, and then sift the mass to separate the fibres. After this, the farina is ready for being boiled into gruel, or *congee*, as it is called in India; but it is bitter, and far inferior to sago. It has, however, occasionally been of much use, and saved the lives of the people at times when famine has threatened them with destruction.

The true sago-palm of Asia (*Sagus*) offers a greater quantity of alimentary matter than is furnished by any other plant, except the banana. The single trunk of a tree of this species, in its fifteenth year, sometimes furnishes six hundred pounds of sago. In the dialect of Amboyna the word *sago* signifies farina (meal). Mr. Crawford, in his 'History of the Indian Archipelago,' has calculated that a single acre of land will support four hundred and thirty-five sago-palms, which will annually produce 120,500 lbs. of sago.

The northern bank of the Orinoco, the great river of South America, is covered with palms of the *Mauritia*, which also produce farinaceous matter, or sago. The whole country in which they abound is subject to inundations; and the fan-like branches of these trees look like a forest which rises out of the bosom of the waters. The navigator who passes along the *delta* of the Orinoco is surprised to see the tops of these trees lighted with fires. They are kindled by a people (the *Guanacas*) who have remained for ages in these marshy districts,—secured from the floods by living in the palms. In the branches they suspend mats, which they fill with clay, and on this damp earth kindle the fires which are necessary for their comfort. Sir Walter Raleigh saw and described these people. The palm offers to this rude race, as well as to other tribes who inhabit the Gulf of Darien and the watery lands between the *Guarapitha* and the mouths of the Amazon, a safe habitation amidst the great inundations to which those countries are subject. But it affords them also, in its fruit, its farinaceous bark, its sap abounding with sugar, and its fibrous stalks,—pleasant food to eat, wine to drink, and thread to make

cordage and hammocks. "It is curious to behold," says Humboldt, "in the lowest stage of human civilization, the existence of a whole race depending upon a single species of palm, in a similar degree with those insects which subsist but upon one species of flower."*

Even the leaves of the date-palm have their uses: their great length and comparatively small breadth, and their toughness, render them very good materials for the construction of coarse ropes, baskets, panniers, and mats. On the continent of Europe, palm-branches are a regular article of trade; and [the religious processions, both of Christians and Jews, in the greater part of Europe, are supplied from some palm-forests, near the shores of the Gulf of Genoa.

The cultivation of the date-tree is an object of high importance in the countries of the East. In the interior of Barbary, in great part of Egypt, in the more dry districts of Syria, and in Arabia, it is almost the sole subject of agriculture. In the valleys of the Hedjaz there are more than a hundred kinds of dates, each of which is peculiar to a district, and has its own peculiar virtues. Date-trees pass from one person to another in the course of trade, and are sold by the single tree; and the price paid to a girl's father, on marrying her, often consists of date-trees.†

The palm is not wholly confined to the warmer latitudes, though in those only it matures its fruit. There are greenhouse specimens in many parts of England. Some of the more luxuriant parts of the province of Valencia, in the south-east of Spain, have very fine forests of date-palms, from which, as well as from the neighbourhood of Genoa, palm-branches are exported. There are date-palms upon the coast of Gallicia, near Ferrol and Corunna; but the fruit on them does not come to maturity. There is abundance of palms in the gardens of Naples; and they are still finer and more numerous in that part of Sicily in the neighbourhood of Palermo,

* Voyages, liv. viii. chap. xxiv.

† Burckhardt's Arabia.

which, from the fertility of its soil, and the variety and beauty of its productions, has the name of "the golden shell." They are also to be met with in some parts of the south of France, though they rarely, if ever, ripen their fruit in that country. There are, in particular, two very majestic specimens growing in the open air in the Botanical Garden at Toulon; but these, so far as we have heard, have not yet flowered. As greenhouse plants, with heat in the colder season, they have been introduced into England for about a century; and the celebrated Miller, of the Botanical Garden at Chelsea, is reported to have been the first cultivator. The Messrs. Loddiges, of Hackney, have palms of considerable height growing under glass; there are also some fine palms in the Botanical Garden at Kew.

The date-palm is a very slow-growing tree; and even in the soil and climate that are most congenial, old trees do not gain above a foot in height in five years, so that, supposing the increase uniform, the age of a tree sixty feet high cannot be less than three hundred years. Dr. Shaw says that the palm of Barbary usually falls about the latter end of its second century.

The PLANTAIN (*Musa paradisiaca*) is a tree of considerable size: it rises with an herbaceous stalk, about five or six inches in diameter at the surface of the ground, but tapering upwards to the height of fifteen or twenty feet. The leaves are in a cluster at the top; they are very large, being about six feet long and two feet broad: the middle rib is strong, but the rest of the leaf is tender, and apt to be torn by the wind. The leaves grow with great rapidity after the stalk has attained its proper height. The spike of flowers rises from the centre of the leaves to the height of about four feet. At first the flowers are inclosed in a sheath, but, as they come to maturity, that drops off. The fruit is about an inch in diameter, eight or nine inches long, and bent a little on one side. As it ripens it turns yellow; and when ripe, it is filled with a pulp of a luscious sweet taste.



The Plantain (*Musa paradisiaca*)

The BANANA (*Musa sapientum*) is a shorter and rounder fruit than the plantain: the stem is also different—that of the plantain being wholly green, while the banana is spotted with purple. The banana is not so luscious as the plantain, but it is more agreeable.

The uses of these plants are much the same, and in our general remarks we shall use the word Banana.

The banana, as we have indicated by the heading of this chapter, is not the property of any particular country of the torrid zone, but offers its produce indifferently to the inhabitants of equinoctial Asia and America, of tropical Africa, and of the islands of the Atlantic and Pacific Oceans. Wherever the mean heat of the year exceeds 75° of Fahrenheit, the banana is one of the most important and interesting objects for the cultivation of man. All hot countries appear equally to favour the

growth of its fruit; and it has even been cultivated in Cuba, in situations where the thermometer descends to 45° of Fahrenheit. Its produce, as already mentioned, is enormous. The banana, therefore, for an immense portion of mankind, is what wheat, barley, and rye are for the inhabitants of Western Asia and Europe, and what the numerous varieties of rice are for those of the countries beyond the Indus.*

The banana is not known in an uncultivated state. The wildest tribes of South America, who depend upon this fruit for their subsistence, propagate the plant by suckers. Yet an all-bountiful Nature is, in this case, ready to diminish the labours of man—perhaps too ready for the proper development of his energies, both physical and moral. Eight or nine months after the sucker



The Banana (*Musa sapientum*).

* Humboldt's Political Essay on New Spain - Black's Translation, vol: ii.

has been planted, the banana begins to form its clusters; and the fruit may be collected in the tenth and eleventh months. When the stalk is cut, the fruit of which has ripened, a sprout is put forth, which again bears fruit in three months. The whole labour of cultivation which is required for a plantation of bananas is to cut the stalks laden with ripe fruit, and to give the plants a slight nourishment, once or twice a year, by digging round the roots. A spot of a little more than a thousand square feet will contain from thirty to forty banana plants. A cluster of bananas, produced on a single plant, often contains from one hundred and sixty to one hundred and eighty fruits, and weighs from seventy to eighty pounds. But reckoning the weight of a cluster only at forty pounds, such a plantation would produce more than four thousand pounds of nutritive substance. M. Humboldt calculates that as thirty-three pounds of wheat and ninety-nine pounds of potatoes require the same space as that in which four thousand pounds of bananas are grown, the produce of bananas is consequently to that of wheat as 133 : 1, and to that of potatoes as 44 : 1.

The banana ripened in the hothouses of Europe has an insipid taste; but yet the natives of both Indies, to many millions of whom it supplies their principal food, eat it with avidity, and are satisfied with the nourishment it affords. This fruit is a very sugary substance; and in warm countries the natives find such food not only satisfying for the moment, but permanently nutritive. Yet, weight for weight, the nutritive matter of the banana cannot at all be compared to that of wheat, or even of potatoes. At the same time, a much greater number of individuals may be supported upon the produce of a piece of ground planted with bananas, compared with a piece of the same size in Europe growing wheat. Humboldt estimates the proportion as twenty-five to one; and he illustrates the fact by remarking that a European, newly arrived in the torrid zone, is struck with nothing so much as the extreme smallness of the

spots under cultivation round a cabin which contains a numerous family of Indians.

The ripe fruit of the banana is preserved, like the fig, by being dried in the sun. These dried bananas are an agreeable and healthy aliment. Meal is extracted from the fruit, by cutting it in slices, drying it in the sun, and then pounding it.

The facility with which the banana can be cultivated has doubtless contributed to arrest the progress of improvement in tropical regions. In the new continent civilization first commenced on the mountains, in a soil of inferior fertility. Necessity awakens industry, and industry calls forth the intellectual powers of the human race. When these are developed, man does not sit in a cabin, gathering the fruits of his little patch of bananas, asking no greater luxuries, and proposing no higher ends of life than to eat and to sleep. He subdues to his use all the treasures of the earth by his labour and his skill;—and he carries his industry forward to its utmost limits, by the consideration that he has active duties to perform. The idleness of the poor Indian keeps him, where he has been for ages, little elevated above the inferior animal;—the industry of the European, under his colder skies, and with a less fertile soil, has surrounded him with all the blessings of society—its comforts, its affections, its virtues, and its intellectual riches.

In a very interesting and instructive paper by Professor Lindley, 'On the Tropical Fruits likely to be worth cultivating in England,'* it is stated, upon the authority of Mr. Crawford, that some of the varieties of the banana possess an exquisite flavour, surpassing the finest pear; and that others in the East Indies have been compared to an excellent reinette apple, after its sweetness has been condensed by keeping through the winter. Of these varieties there are so many, that they would be as difficult to describe as the sorts of apples and pears of Europe. The banana has frequently pro-

* Hort. Trans., vol. v.

duced its bunches of yellow fruit in hothouses in this kingdom; particularly at Wynnstay, the seat of Sir W. W. Wynn; and at Messrs. Loddiges', at Hackney, and at Kew, and other places, and is now a regular article of sale in the fruit-markets of London.



London.

LITCHI (*Dimocarpus litchi*).—**LONGAN** (*Dimocarpus longan*). These fruits are natives of the south of China, where they are held in the highest estimation. They have thence been introduced into many parts of the East Indies, and to the gardens of the curious in some places of Europe. John Knight, Esq., of Lee Castle, near Kidderminster, presented the Horticultural Society with some of the fruit that had ripened in his hothouse in 1816, and it was found to be as good as that which is produced in China. The litchi was introduced into this country by the celebrated Warren Hastings, Esq., in 1786: the longan had been introduced before.

The trees on which these fruits are produced have a

considerable resemblance to each other.—are, in fact, so much alike, that they are distinguished only by the flowers of the litchi being without petals, while those of the longan have eight; and the fruit of the litchi being larger, and generally of a red colour, while that of the longan is always brown. They are moderately sized trees, with brown bark, which is very bright in the twigs. The leaves are large, have some resemblance to those of the laurel, are placed alternate, and hang very gracefully. The fruit is produced in bunches, which are pendent from the extremities of the twigs; and there is a considerable number of fruit in the bunches, not close together, like grapes, but on stalks, the principal ones from six inches to a foot in length; while those of the individual fruit are from one inch to two.

Of both species there are many varieties in China, which differ in the time of ripening, and the form and qualities of the fruit. In general, the litchi is about an inch and a half, or from that to two inches, in diameter, and the longan about an inch and a quarter; and both are covered with small scaly processes, which are most prominent in the longan. Both fruits are covered by tough, thin, leathery coats, within which is the pulp, and in the inside of that a single brown seed. The pulp is colourless, semi-transparent, slightly sweet, and very grateful to the taste. The Chinese prefer the longan, to which they ascribe medicinal qualities; but Europeans give the preference to the litchi, probably on account of its larger size and the greater beauty of its colour. The litchi is often brought to this country in a dried state, in which, though the pulp be much diminished in size, it retains a very considerable portion of its original flavour. From the beauty and flavour of these fruits, and the perfection to which they have been brought in this country, in all cases where they have had a fair trial, it is by no means unlikely that they may become common as house fruit.

CHAPTER XVIII.

CARBONACEOUS SECRETIONS (*continued*):—OIL—THE
OLIVE.

OIL differs from starch and sugar in the possession of a larger quantity of hydrogen than either of these substances. In them the hydrogen exists in combination with oxygen in the proportions to form water, but in oil the quantity of oxygen is so small, that it is believed that both the carbon and hydrogen of oil, when taken into the system as food, unite with oxygen, and assist in keeping up the animal heat of the body. That its agency is more active in this respect than either sugar or starch, may be inferred from the fact, that just in proportion to the diminished temperature on the surface of the earth, is the quantity of oily matter eaten by the inhabitants. Thus the natives of Norway, Sweden, and Siberia eat with avidity train oil, whilst the inhabitants of Greenland were found by Franklin to esteem his tallow candles as a luxury.

Although oil for the food of man is obtained principally from the animal kingdom, yet the animals from which it is procured have obtained it either directly or indirectly from the vegetable kingdom. Animals that are fed on oily foods, when not able to consume them, for the purpose of keeping up animal heat, deposit the oil in the form of fat. Thus oxen fed on oil-cake become fat. On the other hand, animals possess the power of converting starch and sugar into oil in their systems, so that there can be no doubt that a large proportion of the oil yielded by animals has been produced in this way.

Oil is the least digestible of the carbonaceous secre-

tions, and is only taken sparingly by the inhabitants of temperate and tropical climates. It is commonly used in this country in the formation of what is called pastry, in which a combination of the oil takes place with the starch of wheat flour, and an indigestible compound is produced. Whether an analogous combination with this exists or not in the seeds of plants which contain oil, there can be no doubt that they are less digestible than their separate constituents. This is especially the case with those unaccustomed to the various seeds containing oil, as the walnut, chesnut, almond, &c.

Most plants which possess oil in sufficient abundance to render them useful as the diet of man, contain this substance in their seeds.

The olive (*Olea Europea*) is, however, a remarkable exception, and secretes its oil in the pericarp or external covering of the seed.



The OLIVE is a stone-fruit, or rather a double-celled nut, covered by a fleshy pericarpium.

There is something peculiarly mild and graceful in the appearance of the olive-tree, even apart from its associations. The leaves bear some resemblance to those of the willow, only they are more soft and delicate. The flowers are as delicate as the leaves; they come in little spikes from buds between the leaf-stalks and the spikes. At first they are of a pale yellow, but when they expand their four petals, their inside is white, and only the centre of the flower yellow. The matured wood of the olive is hard and compact, though rather brittle, and has the pith nearly obliterated, as is the case with box. Its colour is reddish, and it takes a fine gloss; on which account the ancients carved it into statues of the gods; the moderns make it into snuff-boxes and other trinkets.

The wild olive is found indigenous in Syria, Greece, and Africa, on the lower slopes of the Atlas. The cultivated one grows spontaneously in many parts of Syria, and is easily reared in all parts of the shores of the Levant that are not apt to be visited by frosty winds. Where olives abound they give much beauty to the landscape. "The beautiful plain of Athens, as seen toward the north-west from Mount Ilmettus, appears entirely covered with olive-trees."* Tuscany, the south of France, and the plains of Spain, are the places of Europe in which the olive was first cultivated. The Tuscans were the first who exported olive-oil largely, and thus it has obtained the name of Florence-oil; but the purest is said to be obtained from about Aix, in France.

The particular departments of France in which the olive is most successfully cultivated are those of the Mouths of the Rhone, of the Var, of the Gard, and some others; but it does not ripen its fruit to the north-west of a line drawn from the Pyrenees near Narbonne, to the foot of the little St. Bernard in the Alps; or in that part of France which may be considered as forming

* Olivier.

a portion of the basin of the Mediterranean, and which is inclosed between that sea and the mountains of Cevennes and the Alps.

The proper time for gathering olives for the press* is the eve of maturity. If delayed too long, the next crop is prevented, and the tree is productive only in the alternate years. At Aix, where the olive-harvest takes place early in November, it is annual: in Languedoc, Spain, and Italy, where it is delayed till December or January, it is in alternate years. The quality of the oil also depends upon the gathering of the fruit in the first stage of its maturity. It should be carefully plucked by the hand, and the whole harvest completed, if possible, in a day. To conduct the mucilage, and allow the water to evaporate, it is spread out, during two or three days, in beds three inches deep. The oil-mill is simple: the fruit is reduced to a pulp, put into sacks of coarse linen or feather-grass, and subjected to pressure. The oil first expressed is the purest: the oil of the kernel is said to injure that of the fruit, and cause it to become sooner rancid. The growth of olives and the manufacture of the oil offer a considerable employment to many of the inhabitants of France and Italy. The importation of olive-oil into Great Britain amounted, in 1827, to about four thousand five hundred tons, paying a duty of eight guineas per tun.

The olive grows in England, though, in the severity of our winters, it changes its character. In the south it is an evergreen; but in England it loses its leaves. Indeed it needs protection even in the mildest winters, and it is only in the very warmest summers that it will produce fruit a little, which does not ripen, and is of very slight flavour.

In ancient times, especially, the olive was a tree held in the greatest veneration, for then the oil was employed in pouring out libations to the gods, while the branches formed the wreaths of the victors at the Olympic Games. It was also used in lubricating the human body. Some

* Hillhouse on the Olive Tree.

of the traditions say that it was brought out of Egypt to Athens by Cecrops; while others affirm that Hercules introduced it to Greece on his return from his expeditions; that he planted it upon Mount Olympus, and set the first example of its use in the Games. The Greeks had a pretty and instructive fable in their mythology, on the origin of the olive. They said that Neptune, having a dispute with Minerva, as to the name of the city of Athens, it was decided by the gods that the deity who gave the best present to mankind should have the privilege in dispute. Neptune struck the shore, out of which sprung a horse: but Minerva produced an olive-tree. The goddess had the triumph; for it was adjudged that Peace, of which the olive is the symbol, was infinitely better than War, to which the horse was considered as belonging, and typifying. Even in the sacred history, the olive is invested with more honour than any other tree. The patriarch Noah had sent out a dove from the ark, but she returned without any token of hope. Then "He stayed yet other seven days; and again he sent forth the dove out of the ark; and the dove came to him in the evening: and lo, in her mouth was an olive-branch plucked off: so Noah knew that the waters were abated from the earth."

The veneration for the olive, and also the great duration of the tree, appear from the history of one in the Acropolis at Athens. Dr. Clarke has this passage in his *Travels*,* in speaking of the temple of Pandrosus:—"Within this building, so late as the second century, was preserved the *olive-tree* mentioned by Apollodorus, which was said to be as old as the foundation of the citadel. Stuart supposed it to have stood in the portico of the temple of Pandrosus (called by him the Pandroscum), from the circumstance of the air necessary for its support, which could here be admitted between the caryatides; but instances of trees that have been preserved to a very great age within the interior of an edifice inclosed by walls, may be adduced."

The province of Suse, in Morocco, produces great abundance of olive-oil, which is stated to be equal in

* Vol. vi. p. 246.

quality to the best Florence oil, when it is expressed from the fruit before it becomes quite ripe. Mr. Jackson, in his 'Account of the Empire of Morocco,' mentions a curious circumstance regarding an extensive plantation of olive-trees in the neighbourhood of Messa, which indicates the great facility with which this tree may be propagated. Being struck with the whimsical arrangement of this large plantation, he inquired the cause of their being so arranged, which was thus explained:—"I learnt from the viceroy's aide-de-camp, who attended me, that one of the kings of the dynasty of Saddingia, being on his journey to Souffan, encamped here with his army; that the pegs with which the cavalry picketed their horses were cut from the olive-trees in the neighbourhood; and that these pegs being left in the ground on account of some sudden cause of the departure of the army, the olive-trees in question sprung from them. I confess, while I acknowledged the ingenuity of the idea (for the disposition of the trees exactly resembled the arrangement of cavalry in an encampment), I treated it as fabulous; some time afterwards, however, the following circumstance occurred, which induced me to think the story was not only plausible, but very credible. Having occasion to send for some plants for a garden which I had at Agadeer or Santa Cruz, the fouldah (gardener) brought, amongst other things, a few bits of wood, without any roots or leaf, about eighteen inches long and three in circumference, which he with a large stone knocked into the ground. Seeing the fellow thus employed, I asked him what he meant by trifling in that way? 'I am not trifling,' said he, 'but planting your pomegranate-trees.' I began to take them out of the ground; but some persons who were near assuring me that it was the mode in which they were always planted, and that they would (with the blessing of God) take root and shoot forth leaves the next year, I was at length prevailed on to leave a few in the ground, merely for experiment;—and they certainly did take root, and were in a fair way of becoming good trees when I left Santa Cruz."

CHAPTER XIX.

NUTS—WALNUT; CHESNUT; HAZEL-NUT; ALMOND
COCOA-NUT; BRAZIL-NUT, ETC.



a. Walnut b. Chesnut. c. Hazel nut.

Nuts, properly so called, are hard, dry fruits, containing one or two seeds, and not in any degree fleshy or pulpy. They are often surrounded by a leafy or woody husk, which is called the involucre, enlarged as a covering to the fruit. The kernels of all the esculent nuts are eaten on account of the quantity of oil they contain; but are less digestible than any other vegetable matters.

The WALNUT (*Juglans regia*).—The nuts of this tree have, when perfectly ripe, a very agreeable flavour; and the tree being besides exceedingly valuable as timber, and highly ornamental, it is well worthy of cultivation. The walnuts of commerce are many of them obtained from warmer countries; but were sufficient attention

paid to walnut-plantations, an abundant supply might be obtained in all the southern parts of England. In some parts of Scotland walnuts come to maturity, but they are by no means general. In the unripe state walnuts make an agreeable pickle; and an indelible olive dye is obtained from the pericarp of the ripe fruit. The nut of the hickory (*Juglans alba*) is small, and of little value; and though the nut of the black walnut of Virginia (*Juglans nigra*) is large, the kernel is very small; it is, however, sweet.

Walnuts or chesnuts may be preserved through the winter by pitting them in the earth, as is done with potatoes.

The CHESNUT (*Castanea vesca*).—The chesnut has a prickly involucre, and the nuts grow in a lengthened cluster, upon twigs. The kernel is large, and enveloped in a tough coat of a tint so peculiar as to give its name to a particular kind of colour. When raw the chesnut has a slight trace of walnut taste, but it is much inferior. Roasted, it becomes farinaceous, and resembles a mealy potato. The chesnut is, indeed, the most farinaceous, and the least oily, of all the nuts, and therefore it is more easy of digestion.

In the southern parts of the Continent chesnuts grow so abundantly as to form a very large portion of the food of the common people, who, besides eating them both raw and roasted, form them into puddings and cakes, and even bread. The chesnut produces abundantly in the warmer parts of England; but though the tree grows in Scotland, the fruit seldom comes to maturity there.

The best kinds of chesnuts are grafted. The late Sir Joseph Banks had some brought from Devonshire to his house at Spring Grove, which bore most plentifully; the fruit was smaller than the Spanish chesnut, but much sweeter.

The HAZEL-NUT (*Corylus*).—Of this nut there are several species and varieties.

The common hazel (*Corylus avellana*) has the nut small and short, but the tree grows more easily than the filbert, being found wild not only in forests and commons

in England, and especially upon the banks of dingles and ravines, but occurring in extensive tracts in the more northern and mountainous parts of the country. Several places, whose soil suits its growth, are called after the hazel, such as Haselmere, Haselbur, &c. The common hazel is seldom cultivated as a fruit-tree, though perhaps its nuts are superior in flavour to the others, which are more inviting in size.

The filberts, both the red and the white, and the cob-nut, are merely varieties of the common hazel, and have been produced partly by the superiority of soil and climate where they grow, and partly by culture. The filbert is not thicker than the common nut, but it is at least double the length, and has the kernel large in proportion. The cob-nut is the largest of the species, and it is round: the cluster-nut differs from the others only in the fruit being produced in large clusters at the ends of the branches. A particular form of tree receives in some parts of the country (especially in Kent, where the culture of the filbert is carried on with advantage) the name of the dwarf productive nut, though that name indicates rather the mode in which the tree is trained than the variety to which it belongs. Generally speaking, the filbert is but a low grower, but still considerable ingenuity is exerted in keeping it down, it having been found by general experience that the dwarfing of fruit-trees is the most effectual means of ensuring a large and uniform crop, and fruit of superior quality. The trees that are dwarfed are not allowed to exceed seven feet in height, and they are trimmed in the form of a goblet, with an open centre, as is generally done with well-managed gooseberry-trees. When the tree comes into proper bearing, this goblet has attained a diameter of about six feet, which is every season covered with filberts both outside and inside. The nuts are of excellent quality, and it is found, by comparison, that a tree treated in this manner, with the ground regularly hoed and cleaned, will produce more than three which are planted in a hedge-row or coppice, and allowed to run wild in the usual manner.

There is something singular in the flowering of the hazel: the male catkin makes its appearance in autumn, and continues to increase till spring, at which time the female ovaries, that are to produce the nuts, make their appearance: this takes place as early as February, and before there is yet a leaf upon the deciduous trees; so that, besides its advantages as a fruit, the filbert may be regarded as an ornamental tree at that season when groves and coppices have the least beauty.

The word *filbert* is a corruption of the original English name for this nut, *full-beard*—which was applied to the large and fringed husk, to distinguish it from the closer covering of the common hazel. Our old poet Gower assigns a more classical origin to the name—

“ Phillis

Was shape into a nutte-tree,

That all men it might see;

And after Phillis, *Philberd*

c This tree was cleped.” *

The Constantinople nut (*Corylus colurna*) is a superior nut to even the best variety of the hazel. Its flavour is equal, and its size is more than double. It is a round nut, invested with a deep calyx, or involucre, which covers it almost entirely, and is very much lobed and fringed at its extremity.

L'Ecluse, a distinguished gardener, brought the nuts of the *Corylus colurna* from Constantinople in 1582; and Linnæus states, that in the Botanical Garden at Leyden there was growing, in 1736, a fine tree of this species, planted by L'Ecluse. It was cultivated in England by Ray, in 1666. This tree grows naturally in the neighbourhood of Constantinople.

The American nut (*Corylus americana*) is a beautiful species, extensively spread over North America, and which has been cultivated in the neighbourhood of Paris.

The involucre and bottoms of the nuts of all the species

THE ALMOND.

and varieties of *Corylus* are extremely austere and astringent when in their green state; and it is doubtful whether they might not then be profitably employed either in the tanning of leather, or perhaps for the same purposes as galls.

The Spanish nuts of the shops are fresh nuts from Spain; the Barcelona nuts are another variety, kiln-dried before exportation.

The CAROB-TREE (*Ceratonia siliqua*), which grows extensively in the south of Europe, particularly in some provinces of Spain, of which Valencia is the principal, bears a fruit called the *carob bean*, which is an important article of commerce. It is chiefly used for the feeding of cattle, but furnishes a nutritive aliment to the poor in times when there is a scarcity of bread-corn.

The ALMOND-TREE (*Amygdalus vulgaris*) has a considerable resemblance to the peach-tree in the form of its leaves, and of its blossoms, only the latter are more variable in colour. It is probable that the almond is a native of the western parts of Asia. The almond is mentioned in the Scriptures as amongst the best fruits of the land of Canaan. It is very plentiful in China, in most of the Eastern countries, and also in Barbary. In that country it is the most early bearer of all the fruit-trees. It flowers in January, and gives its fruit in April.* It does not appear that the almond-tree (which is now abundantly cultivated for its fruit in Italy, Spain, and the south of France) was so early introduced into the first of these countries as the peach, or that its native region was so well known, "Greek nuts" being the name given to almonds at Rome in the time of Cato.

The fruit of the almond is not so attractive as that of the peach; because, instead of presenting the same delicious pulp as that, the pericarp of the almond shrivels as the fruit ripens; and when the ripening is completed, has become a horny kind of husk, which opens of its own accord. The kernel of some varieties of the almond is not defended by so tough a shell as that of the peach.

* Shaw's Travels.

and nectarine; for it is often so tender that the nuts break when shaken together.

In the south of Europe, where the almond is cultivated with as much care as the peach is in this country, its varieties are carefully distinguished. The bitter and the sweet are permanently distinct varieties; and after this leading character is observed, the variety is further distinguished by the form and degree of hardness of the shell. For instance, the French have "*amandier à coque dure*"—"amandier à coque demi-dure"—"*amandier à coque tendre*."

In England almond-trees are chiefly cultivated for the beauty of their early flowers; and for this reason, the common kind, and the double-flowering dwarfs, are preferred. There is something very charming in the peculiarity which belongs to this tree, of blossoming on the bare branches:

"The hope, in dreams, of a happier hour,
That alights on misery's brow,
Springs out of the silvery almond-flower,
That blooms on a leafless bough."*

One of the most beautiful tales of the Greek mythology (that of the Loves of Phyllis and Demophoon) is founded on this property of the almond-tree.

Almond-trees ripen their fruit in England, though the produce is very inferior to that which is imported. The flowers of the productive almond, both the sweet and the bitter, are much less showy than those of the unproductive. Like most of the other nut-bearing trees, the almond yields an oil. Between the expressed oil of bitter and that of sweet almonds there is little difference; but the bitter almond contains an essential oil, while the sweet almond has none. Owing to the prussic acid which it contains, this essential oil is found, by experiment, to be exceedingly poisonous; and therefore the use of bitter almonds should be carefully avoided in every instance where there is a chance that the essential oil may

be separated in the stomach. So very violent is the poison of this oil, that instances are recorded of persons dying in consequence of drinking even a very small portion of spirits flavoured by it; and, in its concentrated state, it is probably not exceeded, in its hurtful effects, even by the essential oil of tobacco itself, or by any of the narcotic vegetable poisons.

According to Haller (*Hist. Plant.*), bitter almonds are a poison to birds and quadrupeds.

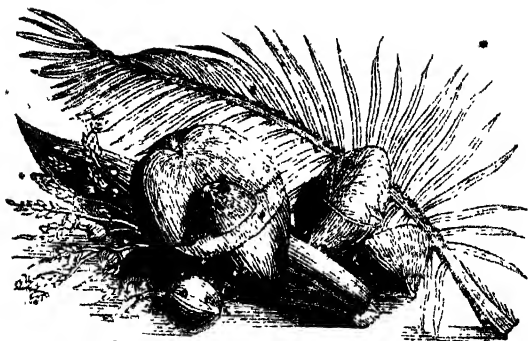
Almond-oil (the expressed oil) is principally obtained from the almonds of Valentia and Barbary; the Syrian almonds, usually called Jordan almonds, being preferred for the table.

The *large-fruited Almond* (*var. macrlocarpa*) is one of the most beautiful varieties of the almond. The flowers are twice as large as those of the common sort, and remain longer in perfection: the fruit also is larger. There is a specimen in the garden of the Horticultural Society, which has been figured and described by Professor Lindley in the 'Botanical Register;' who remarks, that this almond is "increased by budding upon plums and other drupaceous plants."

About four hundred and fifty tons of almonds are annually imported into Great Britain, paying a duty of 18,000*l*.

COCOA-NUT (*Cocos*). The cocoa-palm is supposed to be a native of the south-east of Asia, and is found wild in some of the small islands off the shores; but it has been introduced into almost every part of the tropical regions. Its quality of bearing in the neighbourhood of sea-water is very favourable to its migrations. There are five species enumerated and described by the botanists; but the most valuable is the *Cocos nucifera*, or cocoa-tree, properly so called.

The *C. nucifera* is a very tall tree, the trunk of which is composed of hard and strong fibres, which cross each other like network. There are, strictly speaking, no branches; but the leaves are from twelve to fourteen feet long, with a very strong middle rib, to each side of which the sword-shaped leaflets are attached. The

Cocoa-nut (*Coccos nucifera*).

flowers come out round the top of the trunk, each cluster inclosed in a long spætha or sheath. When these have arrived at maturity, the sheath opens, and the male flowers gradually fall off, leaving the embryo fruit. In a moist and fertile soil the cocoa-palm bears in four years; in a dry region fruit is not produced till it has been planted ten years. The fruit consists externally of a thin, but tough rind, of a brownish-red colour; beneath which there is a quantity of very tough fibrous matter, of which cordage and coarse cloth, matting, and a variety of other articles are manufactured at the present day. Burckhardt says that ships coming from the East Indies to Djidda have cordage made of the cocoa-nut tree. Inclosed within this fibrous mass is the shell, of great firmness, and used for many domestic purposes. While the nut is green, the whole hollow of the shell is filled with an agreeable, sweetish, refreshing liquor. When the nut is gathered, a formation of albumen takes place upon the inside of the shell, producing that white, firm, pleasant-tasted, but rather indigestible substance, which is called the kernel of the nut. Like the kernels of most nuts, that of the cocoa is nutritious, and contains a great quantity of fixed oil, which is also the ingredient to which

its indigestible quality is owing. A tree generally furnishes about a hundred cocoas. The stem of the cocoa-nut tree is very tough and durable, and used for constructing the abodes of the people in the warm countries where it grows, and the leaves are employed as thatch; while the ribs answer the same purpose as osiers in the making of baskets and other wicker-work. The tender shoots at the top of the cocoa-nut tree may be used as esculents, and are very tender and delicate; but they are costly, as they cannot be obtained except at the expense of the tree.

The finest arrack in the East Indies is made from the juice of the cocoa-nut tree. This juice, before it is distilled, is called *toddy*; and those trees from which it is to be obtained are not suffered to bear fruit. There are two ways of obtaining the toddy: they either cut off the monthly shoot from which the fruit would be produced, and collect the sap in jars from the wound; or they make a perforation in the trunk of the tree, which they keep plugged up, unless when they are about to collect the sap. When put in vessels, and kept out of the sun, the toddy undergoes the vinous fermentation, and is fit for distilling; but if it be exposed to the sun, it undergoes the acetous fermentation, and is changed into vinegar.

The cocoa-palm generally reaches the age of from eighty to a hundred years; and its average height is about eighty feet. Its growth is thus more rapid than the other palms.

The other species of cocoa are not so valuable. The seeds of *Cocos butyracea* are very mucilaginous, and also very oily. The pulp of the nuts is used for fattening hogs; and the natives of South America make a sort of butter from it. The Guinea cocoa-nut (*Cocos guineensis*) is much smaller than the others, the trunk not being above one inch in diameter, and twelve feet high. It is tough and hard, and covered with prickles; when cleared of the bark it is made into walking-sticks, which are black, strong, light, and take a fine polish. It grows abundantly in the island of Tobago, after which island the sticks used to be named in France. The fruit is about

the size of a cherry : it may be eaten, but it is very acid, and not pleasant ; though the wild hogs in Jamaica devour it greedily. In some parts of America a sort of wine is made from it. It is found most plentifully in the northern parts of Colombia. The *great maccaw-tree* (*Cocos aculeata*) grows abundantly in the West India Islands. It is a large palm, the trunk being from a foot to a foot and a half in diameter, and rising to the height of about thirty feet. The fruit is small, of a globular form, but a little flattened, and not more than an inch in diameter. The pulp that surrounds the nut has an astringent taste, but the kernel is pleasant. The *Cocos nypa* is thick, but very low ; and in its fruit resembles the cocoa-nut, only the nuts are smaller. It grows in salt-marshes and by the mouths of rivers, in the south-eastern parts of Asia. All the species yield fixed oil : that of the cocoa-nut is clear and sweet. The true palm-oil is obtained from the *Elais guineensis*, an African plant.



The Cashew-nut (*Anacardium occidentale*).

The **CASHEW-NUT** (*Anacardium occidentale*). The cashew-nut tree bears a considerable resemblance to the walnut, and the leaves have nearly the same scent. The fleshy receptacle, vulgarly called apple, which the tree produces, is of an agreeable subacid flavour, and may be fermented into a kind of wine, or distilled into arrack. The nut, of a kidney shape, is attached to the end of the apple; it is inclosed in two shells, between which there is an acrid inflammable oil, which is so caustic that it will blister the skin. The kernel, contained in the second or inner shell, is of a very fine flavour, and used to give a pleasant taste to many products of cookery: it also greatly improves the flavour of chocolate.

BRAZIL-NUT, or JUVIA (*Bertholletia excelsa*). This is one of the most extraordinary fruits of South America, which has been made familiar to us principally by the interesting description of Humboldt. It was first noticed in a geographical work published in 1633, by Laet, who says that the weight of this fruit is so enormous, that, at the period when it falls, the savages dare not enter the forests without covering their heads and shoulders with a strong buckler of wood. The natives of Esmerelda still describe the dangers which they run when the fruit falls from a height of fifty or sixty feet. The triangular grains which the shell of the juvia incloses, are known in commerce under the name of Brazil-nuts; and it has been erroneously thought that they grow upon the tree in the form in which they are imported.

The tree which produces the juvia is only about two or three feet in diameter, but it reaches a height of a hundred and twenty feet. The fruit is as large as a child's head. Humboldt justly observes that nothing can give a more forcible idea of the power of vegetable life in the equinoctial zone than these enormous ligneous pericarps. In fifty or sixty days a shell is formed half an inch in thickness, which it is difficult to open with the sharpest instrument. The grains which this shell contains have two distinct envelopes. Four or five, and sometimes as many as eight of these grains are attached.

to a central membrane. The Capuchin apes (*Simia chiropotes*) are exceedingly fond of the seeds of the juvia; and the noise of the falling fruit excites their appetites in the highest degree. The natives say that these animals unite their strength to break the pericarp with a stone, and thus to obtain the coveted nuts. Humboldt doubts this; but he thinks that some of the order of *Rodentia*, such as the *Cavia aguti*, are able to open the outer shell with their sharp teeth applied with unwearied pertinacity. When the triangular nuts are spread on the ground, all the animals of the forest surround them, and dispute their possession. The Indians, who collect these nuts, say "it is the feast of the animals, as well as of ourselves;" but they are angry with their rivalry. The gathering of the juvia is celebrated with rejoicings, like the vintage of Europe.

Some other plants yield oil, as the chocolate-nut tree (*Theobroma Cacao*), but these are spoken of under other heads,

CHAPTER XX.

PLANTS YIELDING MEDICINAL SECRETIONS — ACIDS —
CITRIC ACID, ORANGE, LEMON, ETC.

IN the foregoing chapters we have spoken of the principal forms of the secretions of plants, which, entering into the system, are either employed for the building up of the fabric of the body or the maintaining its animal heat. We have now to refer to plants which, although they yield in many instances an abundance of both nutritious and carbonaceous secretion, are nevertheless not consumed on their account, but on account of some other secretion they produce. These remaining secretions may be comprehended under the head of acids, volatile oils, and alkaloids. None of these classes of substances, that we are aware, are essential to life, at the same time they are constantly taken by man and the lower animals in their food, and seem to act medicinally on the system.

The first group of these substances, the organic acids, are used extensively by man in his food. Nearly every fruit, and most of the parts of vegetables which are eaten whole, contain a larger or smaller quantity of the vegetable acids. When acids do not naturally exist in the food which he takes, man has recourse to vinegar, acetic acid, which results from the decomposition of various vegetable substances.

The most frequent vegetable acids consumed by man are the citric, tartaric, malic, and oxalic acids. The composition of these compounds is as follows :

	Carbon.	Hydrogen.	Oxygen.
Citric Acid . . .	12	5	11
Tartaric Acid . . .	8	4	10
Malic Acid . . .	8	4	8
Oxalic Acid . . .	2	—	3

It will at once be seen that the composition of these acids is very similar to that of the various carbonaceous secretions; at the same time we have no evidence to prove that these acids are burned in the system in the same way as starch, sugar, and oil. That they are digested and decomposed there can be little doubt, but beyond their results their action is not known. One of the most curious facts in the history of the action of the vegetable acids on the system is the power which citric acid, contained in the juice of the orange, lemon, lime, &c., has in arresting and preventing the disease called scurvy. This disease, which at one time was the great plague of our navy, and the cause of the death of many thousands of seamen annually, is now seldom seen, and this entirely from the use of lemon-juice on board our vessels. It is however a curious fact that the acid, which is easily separated from the juice of the fruit, is not nearly so efficacious as the juice itself. Many theories are advanced to explain these phenomena,* but none are satisfactory. A great fact is, however, very apparent, and that is, that this fruit acts medicinally on the system. It is not fruits that contain citric acid alone that cure the scurvy, but many fresh uncooked vegetable matters have this power, although none appear so efficacious as the fruits of the genus *Citrus*. We think, then, that it is a fair presumption that the vegetable acids generally act upon the system medicinally by preventing a state of the system, the most severe results of which we see in the scurvy of sailors.

The first plants we shall mention are those which produce fruits containing citric acid; of these the most remarkable are the species of the genus *Citrus*, to which the well known orange belongs. The orange is originally a native of tropical climates, and naturally growing only in climates hotter than our own, but by commerce it has been made one of our commonest fruits. The orange may be procured at little more cost than that of the

* Lankester, 'Lectures on the Natural History of Plants yielding Food,' p. 31.

commonest of our domestic fruits; while it is the most refreshing and healthy, perhaps, of all the fruits of the warm countries. It has thus become a peculiar blessing to us: for while it offers a gratification within the reach of the poorest, it is so superior to other fruits, that it cannot be despised for its cheapness, even by the richest. The duty upon oranges is 68,000*l.* per annum, at the rate of 2*s.* 6*d.* for a package not exceeding 5000 cubic inches. Assuming the cubical contents of an orange as ten inches, there are 500 in each package—and thus we see that 272,000,000 of this fruit are annually imported, allowing about a dozen per annum to every individual of the population.

This extraordinary consumption of a production which is brought here from very distant places, is a natural consequence of certain qualities which fit the orange, in a remarkable degree, for being the universal fruit of commerce. If we would have foreign figs and grapes, they must be dried, for the undried grapes, which we bring even from the short distance of Portugal, are flat and vapid; the tamarind is a liquid preserve; the guava must be made into a jelly; the mango destined for us requires to be pulled before it is ripe, and is pickled; the date must be dried; and the cocoa-nut becomes, when here, consolidated and indigestible. With regard to the orange, man may have it fresh in every region of the world, and at almost every season of the year. The aromatic oil and the rind preserve it from the effects both of heat and of cold; and the acidity of the former renders it proof against the attacks of insects. It is true that oranges rot, like other fruits; but that does not happen for a long time, if the rind is uninjured, and they are kept from moisture, and so ventilated as not to ferment.

Most of the oranges and lemons intended for exportation are gathered while they are still green; for if the fruit were allowed to become mature it would spoil in the transport. Lemons are sometimes preserved by being impregnated with sea-water. The gathering of oranges and lemons for the British market generally occupies from the commencement of October to the end of Decem-

ber. Oranges are not fully ripe till the spring has commenced. It is remarkable that the orange-trees from which the fruit is gathered green bear plentifully every year; while those upon which the fruit is suffered to ripen afford abundant crops only on alternate years.*

The species of the genus *Citrus* form one of the most interesting groups of plants. They are all originally natives of the warmer parts of Asia, though they have been long introduced into the West Indies, the tropical parts of America, the Atlantic Isles, the warmer countries of Europe, and even Britain, where they bear the open air during the summer, and, in favourable situations, do not need artificial heat, if kept from the frost, through the winter. They are all either small trees or shrubs, with brown stems, green twigs and leaves, bearing some resemblance to those of the laurel. We cannot, however, judge of the size of the orange-tree by the specimens we ordinarily see in England. In parts of Spain there are some old orange-trees forming large timber;† in the convent of St. Sabina, at Rome, there is an orange-tree thirty-one feet high, which is said to be six hundred years old; and at Nice, in 1789, there was a tree which generally bore five or six thousand oranges, which was more than fifty feet high, with a trunk which required two men to embrace it.‡ The size depends much upon the age of the plant.

There are several distinct species, of which the Lemon, the Citron, the Oranffe, the Mandarin Orange, and the Shaddock, with their varieties, are the principal. They are, even in the East, where they are natives, not a little capricious in their growth; the fruit, and even the leaves, frequently altering, so that it is not always easy to say which is a distinct species, and which only a variety. They continue flowering during nearly all the summer, and the fruit takes two years to come to maturity; so that, for a considerable period of each year, a healthy tree has every stage of the production, from the flower-bud to the ripe fruit, in perfection at the same time.

* Dict. des Sciences Naturelles.

† Laborde.

‡ Risso.



The Citron.

The CITRON (*Citrus medica*, Risso), when growing wild, is a thorny tree, about eight feet high, with leaves of a pale green; the flowers are white, and have a very agreeable odour. The fruit is oblong, five or six inches long, with a rough yellow rind; the outer part of it contains (as is the case with most of the family) a considerable quantity of highly aromatic and inflammable oil; the pulp is white and edible, but very acid, and preferred when prepared as a sweatmeat. Of a particular variety of the citron a conserve is made which is in great demand by the Jews, who use it in their Feast of Tabernacles. With a little artificial heat in winter, the citron comes to as much perfection in England as in Spain or Italy. There are two varieties noticed—the common and the sweet, but whether they have been produced by natural difference or culture is not known.

The LEMON (*Citrus Limonum*, Risso), grows naturally in that part of India which is situated beyond the Ganges; but its transmigration to Europe belongs to the invasion of the West by those mighty caliphs, who, from the heart of Southern Asia, extended their conquests to the foot of the Pyrenees, leaving everywhere traces of their power and of their knowledge. The lemon, thus transported by the Arabs into every part of their vast

empire where it would grow, was found by the Crusaders in Syria and Palestine towards the end of the eleventh century. By them it was introduced into Sicily and Italy; though it is probable that at the same period it was already multiplied in Africa and Spain.* Arabic writers of the twelfth century speak of the lemon-tree as then cultivated in Egypt and many other places. Matthew Silvaticus, a writer of that time, says that the lemon was then spread over all Italy.

In the southern parts of Europe, where the lemon is abundant, there are many varieties.

The rind of the lemon is much smoother than that of the citron; the bark of the tree is less smooth.

The LIME (*Citrus Limetta*, Risso), or sour lemon, is a small and shrubby tree, the fruit of which is much smaller than that of the citron or lemon, being only about an inch, or an inch and a half in diameter. The lime is not much cultivated in Europe; but it is a great favourite in the West Indies, being more acid and cooling than



The Lemon.

* Risso, p. 7.



The Lime.

the lemon. In that country there is a sweet lime, intermediate between the lemon and the sour lime; and botanical writers are of opinion that hybrids or mules are produced between all the varieties, and probably also the species, of the citrons.

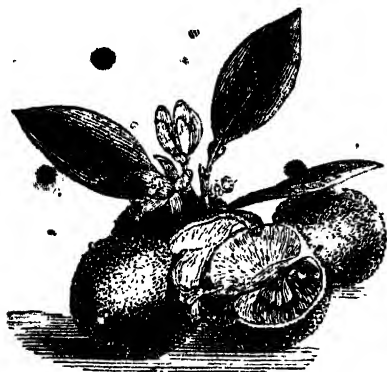
The ORANGE (*Citrus aurantium*, Risso) is a taller and more beautiful tree than either the citron or the lemon; but, like them, it has prickly branches when in its native country. The orange was originally brought from India.

The precise time at which the orange was introduced into England is not known with certainty, but probably it may have taken place not long after their introduction into Portugal, which was in the early part of the sixteenth century.

The first oranges, it is stated, were imported into England by Sir Walter Raleigh; * and it is added that Sir Francis Carew, who married the niece of Sir Walter, planted their seeds, and they produced the orange-trees at Beddington, in Surrey, of which Bishop Gibson, in his additions to Camden's Britannia, speaks as having been there for a hundred years previous to 1695. As

* Biographia Britannica; art. Raleigh.

these trees always produced fruit, they could "not, as Professor Martyn justly observes, have been raised from seeds; but they may have been brought from Portugal, or from Italy (the place whence orange-trees have usually been obtained) as early as the close of the sixteenth century. The trees at Beddington were planted in the open ground, with a moveable cover to screen them from the inclemency of the winter months. In the beginning of the eighteenth century they had attained the height of eighteen feet, and the stems were about nine inches in diameter; while the spread of the head of the largest one was twelve feet the one way and nine the other. There had always been a wall on the north side of them to screen them from the cold of that quarter, but they were at such a distance from the wall as to have room to spread, and plenty of air and light. In 1739 they were surrounded by a permanent inclosure, like a greenhouse. They were all destroyed by the great frost of the following winter; but whether wholly owing to the frost, or partly to the confinement and damp of the permanent inclosure, cannot now be ascertained.

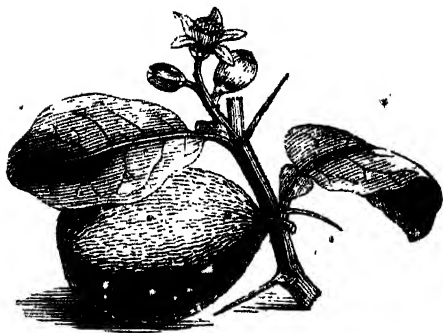


The Orange.

John Parkinson, apothecary, of London, one of the most voluminous of our early writers on plants, who published his 'Prædictæ of Plants' in 1629, gives some curious directions for the preservation of orange-trees, from which one would be led to conclude that the trees at Beddington, with their ample protection of a moveable covering in winter, had not been in existence then. "The orange-tree," says he, "hatf abiden, with some extraordinary branching and budding of it, when as neither citron nor lemon trees would by any means be preserved for any long time. Some keepe them in square boxes, and lift them to and fro by iron hooks on the sides, or cause them to be rowled on trundels or small wheels under them, to place them in an house, or close galeric, for the winter time; others plant them against a bricke wall in the ground, and defend them by a shed of boardes, covered with sear-cloth in the winter; and by the warmth of a stove, or such other thing, give them some comfort in the colder times; but no tent or meane provision will preserve them." The orange-trees at Versailles are, during the winter, wheeled into warm places under the terrace; and the same plan is to be pursued with respect to some fine orange-trees at Windsor, which have been lately presented to his Majesty by the King of France. At Hampton Court there are many orange-trees, some of which are stated to be three hundred years old. They are generally moved into the open air about the middle of June, when the perfume of their blossoms is most delicious. Orange and lemon trees have been cultivated in the open air in England. For a hundred years, in a few gardens of the south of Devonshire, they have been seen, trained as peach-trees against walls, and sheltered only with mats of straw during the winter. The fruit of these is stated to be as large and fine as any from Portugal.*

The SHADDOCK (*Citrus decumana*, Linn.) is much larger than the orange, both in the tree and the fruit. The tree is both lofty and spreading, and the fruit is

* Hort. Trans., vol. i.



The Shaddock.

about eight inches in circumference—some, indeed, much larger. The shaddock is a native of China and the adjoining countries, where the name of “sweet ball” is given to it. There are many varieties—some with the pulp white, others with it nearly red; some that are sweet, with but little acidity—and some acid, with but little sweetness. The shaddock derived its specific name from having been first carried from China to the West Indies by Captain Shaddock. It has, however, been neglected there, and now but seldom merits its oriental name of sweet ball. The planters have never been remarkable for their knowledge of science, or their skill in the new operations of the arts; and thus, instead of propagating the shaddock by budding, as is done in China, and which is the only way that it can be improved, or even kept from degenerating, they have reared it from seed, and consequently have generally obtained a harsh and sour sort, which is of very little value. It is showy, no doubt, from its size, and the appearance of the tree when growing; but it is the least valuable or desirable species of the genus produced in the West.

These are the species of the orange genus usually

known in commerce; but on account of the beauty, the good qualities, and the abundance of these delightful fruits, as well as the length of time that they remain in season, they demand a more detailed account than can, in this sketch, be given of many of the other acid fruits. The manner, too, in which truth and fable are blended in their common history, renders such an account more desirable; and thus we shall devote a few pages to the further consideration of the genus.

At the time when the people of Europe first visited the Levant in great numbers—that is, during the Crusades for the recovery of Syria from the dominion of the Saracens—oranges were found abundant in that country. Though they were in reality cultivated trees, their number, and the beauty and goodness of their fruit, naturally caused the adventurers (who were not very conversant with Natural History, and not a little prone to romance and credulity) to believe and state that these were indigenous to the country, and formed a portion of the glories of the “Holy Land.”

The fables of the profane writers, and the ambiguity of the descriptions of vegetables in Holy Writ, helped further to confirm this opinion. As the oranges were of the form of apples, and the colour of gold, it did not require much stretch of imagination to make them the golden apples of the Garden of the Hesperides; and the only point that remained was to settle the locality of that fabled paradise, which was generally laid in the part of Africa which lies between the mountains of Atlas and the southern shore of the Mediterranean. The authority of Moses was called in to confirm the existence of this fruit in Syria, even at the time when the children of Jacob were wandering in the wilderness; and one of the trees borne in the procession commanded in the twenty-third chapter of the book of Leviticus, was considered to have been the orange. The *mala medica* of the Romans, which is mentioned by Virgil, and afterwards by Palladio and others; the *kitron* of the Greeks; and the *citrus* of Josephus, were all understood to mean the same fruit; and, as has been found to be the case

with many other substances, the moderns supposed that, because there was an identity of the name, there must be an identity of substance—never reflecting that the name had been imposed by themselves, and that therefore its identity proved nothing.

The fable continued, however; and, though there was a good deal of writing upon the subject, there was no attempt to examine the authorities with that minuteness which the search of truth demanded, till the nineteenth century. The history of this fruit was first carefully traced by Galessio, who published his '*Traité du Citrus*,' at Paris, in 1811. He maintains that the orange, instead of being found in the north of Africa, in Syria, or even in Media, whence the Romans must have obtained their "Median Apples," was not in that part of India which is watered by the Indus at the time of Alexander the Great's Indian expedition, as it is not mentioned by Nearchus among the fruits and productions of that country. It is not mentioned either by Arrian, by Diodorus, or Pliny; and even so late as the year 1300, Pietro di Cuescengi, a senator of Bologna, who wrote on agriculture and vegetable productions, does not take the least notice of the orange.

The first distinct mention of oranges is by the Arabs; and Avicenna (book v.) not only describes *oleum de citrangula* (oil of oranges) and *oleum de citrangulorum seminibus* (oil of orange-seeds), but speaks of *citric acid* (salt of lemons), which is contained in all the genus, though more abundantly in that species from which it got its common English name.

According to Galessio, the Arabs, when they penetrated to India, found the orange tribes there, further in the interior than Alexander had penetrated; and they brought them thence by two routes: the sweet ones, now called China oranges, through Persia to Syria, and thence to the shores of Italy and the south of France; and the bitter oranges, called in the commerce of England, Seville oranges, by Arabia, Egypt, and the north of Africa to Spain.

It does not appear that the orange was originally a

Chinese fruit, as it is not mentioned by Marco Polo, the father of modern travellers, who is so circumstantial in describing all the other wonders of that country.

Now these facts certainly go far to show that the orange was not known to the ancients either in Europe or in Syria; but that we are indebted for the first knowledge of it to the Arabs, who, with their zeal to propagate the religion of the Koran, were as anxious to extend the advantages of agriculture and medicine. The sweet orange which they introduced was not, strictly speaking, that which has since been called the China orange, and under that name introduced into Spain, Portugal, St. Michael's, the other Atlantic isles, and the West Indies; but rather the orange which was known in Italy before Vasco de Gama had doubled the Cape of Good Hope.

The orange is said to have been found by the Portuguese upon the east coast of Africa; but it is not known whether it has been indigenous there, or disseminated by the Arabs. When the Portuguese reached India, they found the orange there, and also in China, which was visited for the first time by sea in the early part of the sixteenth century.

Although the oranges of St. Michael, in the Azores, are now the best that are to be met with in the European market, they are not indigenous productions of that island; but were sent there by the Portuguese, as the same fruit was originally sent to the American continent by the Spaniards. In the middle of a forest, on the banks of the Rio Cedeno, Humboldt found wild orange-trees, laden with large and sweet fruit. They were, probably, the remains of some old Indian plantations; for the orange cannot be reckoned amongst the spontaneous vegetable productions of the New World.

But, in whatever way oranges were first introduced into those parts of the world of which they are not natives, they are now very widely diffused; and wherever they are found they are among the most ornamental of trees, and the most delightful of fruits. The species and varieties have also been greatly multiplied; but whether

from their proneness to produce varieties, from some original differences, or from difference of soil and climate, cannot now be ascertained. Including all the different species, Risso, an eminent naturalist at Nice (and, from his living in a country producing oranges, he had the best opportunities of examining and studying them), has, in a very elegant and elaborate natural history of oranges, published at Paris in the year 1818, enumerated, described, and, with respect to all the more important sorts, figured no fewer than one hundred and sixty-nine varieties: these he has divided into eight species—sweet oranges, bitter oranges, bergamottes, limes, pampelucos, sweet limes, lemons, and citrons.

Of the first of these there are no fewer than forty-three varieties; though, in the opinion of Galessio, they are all derived from the common orange. The others are, generally speaking, more acid in their flavour; though some of them, such as the bergamottes, from the rind of which the celebrated oil of bergamot is obtained, are highly perfumed.

Of the bitter oranges Risso enumerates thirty-two varieties; of the bergamottes, five; of the limes, eight; of the pampelucos, six; of the sweet limes, twelve; of the lemons, forty-seven; and of the citron, seventeen.

There is something peculiar in the organization of all the fruit of the orange tribe. The rind or external pericarp of them all is a spongy texture, containing but little juice or sap of any kind in its substance; but the external surface is covered, or tuberculated over, with little glands that secrete a volatile oil which is very inflammable, more or less acid according to the species, and of a very strong and pungent scent.

The family of the oranges, in some places in many of their varieties, are now cultivated in Portugal, in Spain, in France, in Italy, and in Greece. In the first two countries they especially abound—in Algarve, and in the fine plains of Andalusia, on the banks of the Guadalquivir. The latter is the place from which the bitter or Seville oranges (*Citrus vulgaris*), are chiefly obtained. In Algarve and Andalusia the orange-trees are of great

size ; and extensive orchards of oranges have formed the principal revenue of the monks for several centuries ; and in the latter province, whose craggy mountains are covered with gardens, and vineyards, and forests abounding in fruit, the flowers of the orange fill the air with their perfume, and lead the imagination back to those days which the Moorish poets and historians delight in describing, when the land which they conquered was adorned with all the refinements of their taste and intelligence, and the luxuries of the East were naturalized in the most delicious regions of the South. In Cordova, the seat of Moorish grandeur and luxury, there are orange-trees still remaining, which are considered to be six or seven hundred years old ; the trunks of these old trees have begun to decay ; and when they get diseased, they are crusted with a kind of lichen, which is supposed to be peculiar to the orange. In France, the orange country is chiefly Provence, or that part of the south which lies to the eastward of the Rhone ; and plantations or groves of oranges are the most abundant and the most beautiful on the banks of the Var, and especially in the environs of Nice, where the species are very many, and come to great perfection. To the west of the Rhone, the country along the coast is flat, sandy, and barren ; and on the plains of Languedoc, that lie interior of this barren tract, the olive thrives better than the orange, apparently because there are no secondary mountains between the cold heights of the Cevennes and the plains. The country to the eastward of the Rhone is much better adapted for choice vegetables, both in soil and in aspect. In the western or French part of it, the Alps descend gradually, by successive elevations, from the high summits of Mont Blanc, Mont Rosa, and St. Bernard, to the sea. Thus the low grounds are finely exposed to the southern sun ; and being at the same time sheltered from every quarter whence a cold wind could come, the vegetation is at once luxuriant and choice. The finest bulbous flowers, the myrtle, the cactus ; and many others, give more the air of the perpetual summer of the tropical countries, than is to be found perhaps in

any other country of Europe—certainly in any other of the same extent.

The glory of that delightful country is the orange, which, when full grown, attains the height of about five and twenty feet, and is graceful in all its parts. The trunk and older branches are of a delicate ash colour; the twigs of so soft a colour that they almost appear transparent; the leaves are moderately large, beautifully shaped, of a fine healthy green, and shining on the upper sides, while the under ones have a slight appearance of down. The flowers, which are in little bunches, and very graceful in their form, are, in the sweet oranges, of a delicate white, and, in the more acid varieties of the family, lightly marked with pink. Some plants have a more powerful odour, and are for the moment more rich; but there is a freshness in the aroma of an orange-grove which never offends or cloy; and as the tree is at one and the same time in all stages of its bearing—in flower, in fruit just set, and in golden fruit, inviting the hand to pick and the palate to taste—it is hardly possible to imagine any object more delightful. The perfumes of Arabia do not exceed the fragrance of the groves on the north of the Mediterranean, in which the beautiful white Provence rose, the tuberose, and countless other flowers, blend their sweets with that of the orange; and where, with all this richness, the pestilent airs of the tropics, and even the *sirocco* of the southern parts of Italy, are altogether unknown. This delightful fertility and fragrance accompany the chain of the Apennines round the whole gulf of Genoa, and until, upon the boundary of the plain of Tuscany, they subside in elevation, and bend more towards the Adriatic.

Tuscany is farther to the south; but the climate and the vegetation cannot be compared to those of the little valleys of Provence and Liguria, especially the latter. About Florence there are still orange-trees in the gardens; but there are none of those aromatic groves and plantations which are found farther to the west. Nor are the causes difficult to find out. There is an enemy on each side of the plain of Tuscany, which will

not allow the orange to arrive at perfection. The gales that come from the south-east, over the sandy shores near Leghorn, are not adapted for a plant which, as well as heat and pure air, requires a considerable quantity of moisture; and the winds from the north, that are cooled in passing over the Adriatic, are not so genial as those from the Alps, that are warmed in passing over the vale of Lombardy. But still the olives, the grapes, and the melons of the vale of the Arno, in so far compensate the inhabitants for the want of the orange.

Eastward of Tuscany, though the coast of Italy inclines still farther to the south, it is even less adapted for the production of the orange; the sea-coast is barren, the interior is dreary, and over the whole the pestilent *malaria* creeps, forbidding man to approach even for the cultivation of the fields; and thus it may be that, ere long, the arid downs by the sea will meet the marsh of the interior, and the centre of Italy shall be desolation to the very base of the Apennines. After the gulf of Gaeta is passed, and the shelter of the more elevated mountains of Calabria is obtained, orange-groves again make their appearance.

Thus the locality of the orange depends fully as much upon situation and soil as upon latitude; and therefore we need not wonder that, considering the many and varied lands in which it is cultivated, there should be so many varieties of its fruit. There is no absolute reason for supposing that the sweet and the bitter orange were originally different; and even now they are not so different as two mushrooms of the very same variety—the one produced upon a dry and airy down, and the other upon a marsh. Now, if it be true that the bitter orange of Seville came, by successive removals, from the head of the Persian Gulf, along the margin of the salt desert, till it reached the states of Barbary, where it was transplanted into Spain; if the sweet orange of Malta, Italy, and France, came through the more fertile parts of Persia and Syria; and if the orange of India and the Azores came direct, from China; it would follow that each should have those qualities which we find in it;

and that the opinion of Galeccio is borne out by the only evidence which the case admits.

Looking at the facts, we are induced to infer, that, if the temperature be sufficiently high for maturing its flavour, the orange is delicious in proportion to the uniform salubrity of the air; and that those high temperatures which force a very large expansion of the fruit are against the fineness of its quality. In this respect, we have an opportunity of contrasting both the oranges of islands and those of continents. St. Michael's, in the Azores, and Malta, are both small islands: the former always exposed to the equalizing breezes, which, from whatever quarter they blow, are always wafted across the expanse of the Atlantic; and the latter lying near the dry and sultry shores of Africa, and, of course, subjected to more changes of season and a higher temperature. There is also some difference in the soil. Whether it be the decomposition of the rock, or saline particles brought by the same pestilent wind that withers the south of Italy and Sicily with the *sirocco*, it is well known, that under the artificial earth (brought originally from Sicily) which forms the soil of Malta, there gathers a crust; and that if the earth be not trenched, and this crust removed at the end of a certain number of years, it ceases to be productive, or the produce becomes so bitter that it is not healthful. St. Michael's has no such disadvantage; the soil there is native and fertile, and deposits nothing calculated to injure its fertility, or impair the qualities of its produce.

The oranges of the two islands are such as one would expect from these differences: the Maltese orange is large, the rind is thick and spongy, the glands that secrete the volatile oil are prominent, the pulp is red, and there is a trace of bitterness in the taste; while the St. Michael's orange is small, the rind is thin and smooth, the glands less prominent, the volatile oil in smaller quantity, and the lighter-coloured pulp more sugary and delicious. Some allowance must no doubt be made for the original differences of those oranges, regarding them as having come in the manner stated by Galeccio; but they

have now been long enough in both islands for having their qualities modified by the different climates and soils.

The modifications produced by differences of soil and climate, in the same vegetable, are among the most important inquiries in the science of plants; and they are at the same time among the most difficult, and certainly the least attended to. One principal source of the difficulty lies in the observer being as much changed as the thing observed. Those who are parched with thirst do not stop to analyze the water, or descant upon the flavour of whatever beverage they may have recourse to for slaking it. The removal of the painful sensation is to them far more delicious than the purity of the most limpid spring, or the flavour of the choicest wine. Just so with man when he is panting under a burning atmosphere: the fruit which is most delicious to him is that which is most cool. This necessary change in the judge, as well as the thing judged of, must never be omitted when we come to compare the fruits of different countries, as reported of by those who have enjoyed them there; and we never can be certain of their real merits till we have them decided by the same individual under the same circumstances. To take a case in point: a guava, apart from its rarity, is certainly not in this country anything comparable to a peach; and yet those who have been in tropical countries talk in raptures of the guava, and say that the fruit grown here is inferior and degenerated. But they should bear in mind, that in the tropical countries there is the tropical zest, as well as the tropical flavour. The man who traverses a mountain country in the north, heeds not the glittering fountains that issue from every rock around him; but send him from Suez to Bassora, or from Morocco to Fezzan, and he would remember them with veneration.

But, again, we have a further confirmation when we compare the Continental oranges. The climate of the slopes and valleys of the Estrella, near the lower Tagus, and that of the Maritime Alps, and the Apennines, in Provence, and Liguria, are certainly very different from

the climate of Andalusia. The diversities of surface, and the vicinity of the sea, keep the air over the former places in continual play and motion, and prevent those intense heats which unquestionably (though by a process which chemistry has not yet fully investigated) render the juices of plants acid, acrid, or saline; while, from the wider extent of Andalusia, and its comparative distance from the ocean, the air over it is, in the warmer months, much more quiescent.

These considerations will, to a certain extent, explain why there are so many varieties in a fruit, which, according to the authorities, appear all to have come from the same part of the world; and a further extension of these considerations would form a criterion of the situations in which it would, or it would not, be desirable to cultivate the orange.

CHAPTER XXI.

MULBERRY; CURRANT; GOOSEBERRY; RASPBERRY; STRAWBERRY; BARBERRY; ELDER; BRAMBLE, ETC.



a, Currant. b, Gooseberry. c, Raspberry. d, Strawberry.
e, Mulberry.

THE following plants contain citric acid, and in many instances other acids, in their fruits.

THE MULBERRY (*Morus nigra*).—The mulberry-tree appears to have formed an object of cultivation at a very early period in the western parts of Asia and in Europe. The attention there bestowed upon it, must have been solely on account of its fruit; for the knowledge of the mode of rearing silkworms was confined to the people of central and southern Asia till the sixth century. We read in the Psalms that the Almighty wrath destroyed

the "mulberry-trees with frost;" and this must have been recorded as a remarkable instance of the divine displeasure, for the mulberry is universally known not to put forth its buds and leaves till the season is so far advanced that, in the ordinary course of events, there is no inclement weather to be apprehended. It has therefore been called the wisest of trees; and in heraldry it is adopted as "an hieroglyphic of wisdom, whose property is to speak and to do all things in opportune season."* In the history of the wars of David with the Philistines, the mulberry-tree is mentioned as a familiar object. Pliny says of it, somewhat questionably, that "when it begins to bud, it despatches the business in one night, and that with so much force, that their breaking forth may be distinctly heard." Thunberg, an Oriental traveller, tells us, what is still more extraordinary, that the sheath which encloses the flower of the talipot-palm bursts with an explosion like the report of a cannon.

In this country there are many old mulberry-trees of large dimensions, and remarkable also for the quantity of fruit they bear. It is probable that some of these old trees were planted at the latter end of the sixteenth and the beginning of the seventeenth centuries; for James I. endeavoured to render the cultivation of the tree general, in the same way that Henry IV. had laboured to introduce it in France. The first mulberry-trees of England are said to have been planted at Sion House, the seat of the Duke of Northumberland, in 1548; and the trees, though decayed in the trunk, still bear fruit. Mulberry-gardens were common in the seventeenth century, in the neighbourhood of London; but either from the climate or the prejudices of the people, the growth of silk never prospered. The mulberry is distinguished for the facility with which it may be propagated. A cutting from a tree which has borne fruit will soon become a vigorous plant. It is recorded that, at Bruce Castle, at Tottenham, an immense branch being torn off by the wind from an old mulberry-tree, about forty years ago, the branch was

* Guillim's 'Display of Heraldry.'

thrust into the ground, and flourished. It is now a handsome tree. That part of the trunk of the old tree which lost the branch is covered with lead. But at the same time the mulberry has been also remarkable for not producing fruit till the trees have acquired a considerable age; and this circumstance has materially affected its cultivation as a fruit-tree. The same objection has applied to the walnut. Recent experiments, however, have shown that, by proper culture, both the mulberry and the walnut may be made to produce fruit at three years old.

The sort principally cultivated for fruit is the black mulberry (*Morus nigra*), although the fruit of the white, Tartarian, red, and Pennsylvanian species (of the white particularly) "are of sufficient consequence to merit a place in a list of edible fruits."* The black mulberry is a hardy tree; and, as the berries are abundant, and of very wholesome quality, while the wood makes excellent timber, and the leaves are adapted to the feeding of silkworms as well as those of the white mulberry, it deserves more attention than it generally receives.

The mulberry is the latest tree to put forth its leaves; and it drops every leaf on the first night of severe frost. Some trials have been made of mulberries trained against a south wall, and the result has been a great improvement in the fruit.

THE CURRANT AND GOOSEBERRY (*Ribes*).—The currant was formerly erroneously held to be the Corinthian grape degenerated. It is now considered as a native of this country, the red (*Ribes rubrum*) being found growing naturally in many places both of England and Scotland, and the white being merely a variety of the red. Mr. Aiton, in his 'Hortus Kewensis,' is of opinion that it is a native production. Its name, however, being the same as the small seedless grape of the Levant (*Corinth*), is against this theory; and in Dodoen's 'History of Plants,' translated in 1578, it is called "the red beyond-sea gooseberry." The white, having the

* Horticultural Society's Fruit Catalogue.

most delicate flavour, is most in request for the dessert. The red is principally used in the preparation of jellies; and the white is converted into wine, which, with fine fruit, and using the juice alone, or only with sugar, without any mixture of spirits or of water, may, when kept to a proper age, be made to equal some of the inferior wines from the grape. For pastry, the currant is amongst the most valuable of the British fruits, being easily preserved, and growing in sufficient abundance, on account of its hardness, to offer a cheap luxury to the humblest classes. This bush forms the principal ornament of some of those neat cottages which are or were the peculiar characteristic of England; and which it would be wise, as well as benevolent, in the landlords to multiply, if they could steadily keep out of them all who were unable to maintain themselves. In parts of the country where it is the custom to train the currant against the walls of the house, its rich dark leaves, and its brilliant fruit, growing over the latticed window, offer almost as pleasing a picture as the vines of Italy.

The *Black Currant* (*Ribes nigrum*) is supposed to be a native of Britain; or, at all events, the period of its introduction is unknown. The berries are larger than those of the red or the white, but they are not so juicy; and the crop upon a single bush is less abundant. Their taste is peculiar, and to some disagreeable; they are supposed to have medicinal qualities which do not belong to the other species of currants. They answer well for tarts and puddings; they can be made into a very pleasant jelly, which, in village pharmacy, is recommended in cases of sore throat; and they make a very good *rob* (sourcing) for flavouring liquors. The leaves of the black currant have a strong taste, especially in the early part of the season; and if a small portion be mixed with black tea, the flavour is changed to one resembling that of green. On this account, it is suspected that those leaves are pretty extensively used in the adulteration of tea,—the coarser sort of black being coloured green by moistening it with vinegar, laying it upon heated plates of copper till it be shrivelled into small balls, and mixing

it with black currant leaves, which have also been shrivelled by heat. If this process has been employed the tea will discolour a silver spoon.

There are thirty-five varieties of the currant specified in the Fruit Catalogue of the Horticultural Society; but there is perhaps no class of fruits in which so much ignorance exists as to the merits and difference of the varieties. It is stated to be impossible to obtain the different kinds with certainty from the nurseries.

The GOOSEBERRY (*Ribes grossularia*), if not a native of Britain, is yet a fruit much better adapted to cold than to warm climates. It was cultivated here in the time of Tusser, a writer on husbandry, who flourished in the reign of Henry VIII. He says,

"The barbery, respis,* and gooseberry too,
Look now to be planted as other things do."

In the south of Europe, it is small, tasteless, and neglected; and though it grows to a large size in the warmer parts of England, its flavour there is very inferior to that which it has in Scotland. Even in that country, the flavour seems to increase with the cold, for if there be warmth enough for bringing gooseberries to maturity and ripening them, the farther north they are grown the better. The market-gardeners about Edinburgh pay much attention to the culture and kinds of their gooseberries; but they are never equal in flavour to those which are grown at Dundee, Aberdeen, or Inverness.

In England, the Lancashire gooseberries are the finest in appearance. They are very large; but their flavour is far inferior to that of the Scotch. Perhaps the inferiority of the English berries may be in great part owing to the large sorts that are cultivated,—the finest, even in Scotland, being those that are of a middle size.

Gooseberries are of various colours,—white, yellow, green, and red; and of each colour there are many sorts. If, however, any particular sort be wished to be preserved, it must be done by cuttings, because the seeds of

* Raspberry

any one sort are apt to produce not only all the known sorts, but new ones. In almost all fruit-trees, indeed, that run into sorts, the only way of securing a favourite sort is by budding, grafting, or planting cuttings. The bud or the branch does not change, but the seed does; and most of the varieties of apples called pippins have been obtained by sowing the seeds or pips of other sorts. It is generally supposed that this is effected by variation of soil and climate; and as it is well known that every cultivated vegetable degenerates when repeatedly sown in the same soil, it is by no means improbable that the quality of fruit-trees might be very much improved by raising them from the seed, in situations as different as possible from those in which the seed is produced.

The gooseberry plant, under favourable circumstances, will attain a considerable age, and grow to a great size. At Duffield, near Derby, there was, in 1821, a bush ascertained to have been planted at least forty-six years, the branches of which extended twelve yards in circumference. At the garden of the late Sir Joseph Banks, at Overton Hall, near Chesterfield, there were, at the same time, two remarkable gooseberry plants, trained against a wall, measuring each upwards of fifty feet from one extremity to the other.*

The yellow gooseberries have, in general, a more rich and vinous flavour than the white: they are, on that account, the best for the dessert, and also for being fermented into wine. * When the sort is choice, and well picked, so that none of the fruit is damaged, or over or under ripe, and when the wine is properly made, it often puzzles an unpractised taste to distinguish the wine of the best yellow gooseberries from champaign. It has the flavour and colour, and it mantles like the best of the foreign wine.

Generally speaking, the green gooseberries are inferior to the yellow, and even to the white: many of them, however, run large, and are used for the sake of appearance. Large gooseberries in general, and large green ones

* Hort. Trans., vol. v.

in particular, are thick in the husk, and contain less pulp than those of a smaller size; while the flavour is in general rich in proportion to the thickness of the husk. Some of the larger greens, especially those that are smooth, gourd-shaped, and of a brownish tinge, are almost tasteless, or even disagreeable.

The red gooseberries are very various in flavour, but are commonly more acid than the others. The same may be said of most other fruits; and it agrees with the well-known fact that acids change the vegetable blues to red. In many fruits, and the gooseberry in particular, the amber colour is accompanied by the richest vinous flavour, while the white tends to insipidity. When the green is deep and pure, sweetness seems to be the leading characteristic, as in the Gascoigne gooseberry, the green-gage plum, and the small green summer pear known in Scotland by the name of the "Pinkey green." Among the red gooseberries there are, however, many exceptions. Some of the older and smaller red sorts (especially that known by the name of the "old ironmonger") are very sweet. It would be unavailing to fix upon any particular kind of gooseberry as the best, as every year produces new varieties. In the Fruit Catalogue of the Horticultural Society there are nearly two hundred kinds enumerated, of which about a hundred and fifty are the large Lancashire gooseberries.

The cultivation of gooseberries forms a pleasing occupation amongst the manufacturers of that part of the kingdom; and the custom has doubtless a tendency to improve both the health and the morals of the people. Any pursuit which makes men acquainted with the peculiarities of vegetable economy, in however small a degree, has a beneficial effect upon the heart and understanding: and it is certainly better for weavers and nailers to vie with each other in raising the largest gooseberries, than in those games of chance or cruel sports to which the few leisure hours of the working classes are too often devoted. The one is a rational and innocent emulation; the other, a degrading excitement, or a brutal indulgence. The names of the Lancashire gooseberries are indicative

of their humble origin. "Jolly Miner," "Jolly Painter," "Lancashire Lad," "Pastime," "Top Sawyer," and so forth, may appear odd to a foreigner; but they are characteristic of the manners of the country in which they are produced, as the high-sounding titles which distinguish the fruits of other nations are indicative of theirs.

The gooseberry-shows of Lancashire, Cheshire, Staffordshire, Warwickshire, and other manufacturing counties, are conducted with great system; and an annual account of them, forming a little volume, is printed and published at Manchester. The heaviest gooseberry which appears to have received a prize, was exhibited at the Shakspeare Tavern, Nantwich, in 1825; it weighed 31 dwts. 16 grains. The prizes given on these occasions are adapted to the manners of the homely people who contend for them, being generally either a pair of sugar-tongs, a copper tea-kettle (the favourite prize), a cream-jug, or a corner-cupboard. The proceedings of these contests, and the arrangements for future years, are registered with as much precision as the records of horse-racing; and, doubtless, the triumphs which are thus handed down, to the collier's or the weaver's children, by the additions which the good-man makes to his household ornaments, are as deeply valued as the "gold cups" of Newmarket.

The RASPBERRY (*Rubus idæus*).—This plant obtains its common name from the rough and bristly appearance of the fruit. The French call the raspberry "Ronce du Mont Ida," (in common parlance "Framboise,") considering it a native of that classic ground, for which they have the authority of Pliny. The root is perennial and spreading, but the stems last only two years. Both the red and the white varieties are natives of Britain, and prefer situations that are shaded and rather moist. The uses of the raspberry, both for the table and for sweetmeats, are well known. Though the flavour of raspberries is peculiar, it is one which is very generally liked; but it is the most fleeting with which we are acquainted. Even a few hours will diminish it; and if the berries be kept for two or three days, the flavour is

almost entirely gone. Even on the bush the flavour does not continue above two or three days after the fruit is ripe. Raspberries, indeed, to be enjoyed in perfection, should be eaten from the bush. They require less attendance than almost any other fruit; and if the twice-bearing kind be mixed with the others, they may be continued till November. The shrubs come into full bearing about three years after the planting of the stools or roots, and they last good for about three years more, at the end of which they begin to degenerate. The common mode of propagation is by cuttings, which should always be taken from plants that are in their prime bearing condition, on or about the fourth year after they are planted. A quantity of peat or bog-earth greatly improves both the size and the flavour of raspberries. New varieties may easily be obtained from the seed, the plants raised from which begin to bear the second year. There are thirty-five varieties of raspberry mentioned in the Fruit Catalogue of the Horticultural Society; of which the differences in quality are very considerable. Gardeners in general appear to have paid too little attention to these differences.

The STRAWBERRY (*Fragaria vesca*).—No vegetable production of the colder latitudes, or which can be ripened in those latitudes without the assistance of artificial heat, is at all comparable with the strawberry in point of flavour; and, if the soil and situation be properly adapted to it, the more cold the climate, indeed the more bleak and elevated, the more delicious is the berry. The fine *aroma* of the strawberry is not quite so evanescent as that of the raspberry; but it is by no means durable, and the berries can be had in absolute perfection only when taken from the plants, and in dry weather; for a very slight shower will render the strawberry comparatively flavourless. The soils and situations in which the strawberry and the raspberry come to the greatest perfection are the very opposites of each other. The strawberry, in all its varieties, certainly in all the finest of them, is a sort of rock plant, and soil which contains a good deal of decomposed rock, more especially if that rock be

greenstone, or any other containing much clay, produces fruit of the finest flavour. The places where the strawberry is the finest, as raised for the market, and of course as produced at the least expense of artificial culture, are probably Edinburgh and Dundee, at both of which the soil is of the description mentioned.

The strawberry is very widely diffused, being found in most parts of the world, especially in Europe and America. Its common name is peculiar to England, and is supposed to have been derived from the custom of laying straw under strawberry plants when their fruit begins to swell; which method the gardener of Sir Joseph Banks revived with advantage. Others, however, contend it is *strawberry*, from its trailing along the ground. The fruit was known in London, as an article of ordinary consumption, in the time of Henry VI. In a poem of that age, called 'London Lyckpeny,' by John Lidgate, who died about 1483, we find the following lines:—

“Then unto London I dyde me hye,
Of all the land it bearyeth the pryse;
'Gode pestode,' owne began to cry—
'Strabery rype, and cherrys in the ryse.'”

It is mentioned by Hollinshed, and the fact has been dramatised by Shakspeare, that Gloster, when he was contemplating the death of Hastings, asked the bishop of Ely for strawberries:—

“My lord of Ely, when I was last in Holborn,
I saw good strawberries in your garden there.”

The palace and garden of the bishop occupied the site which is now Ely-place.

The cultivation of the strawberry, at the present time, is very extensive in the neighbourhood of London. The largest quantities, and the finest sorts, are grown at Isleworth and Twickenham. One of the most remarkable examples of the power of the human body in the endurance of great and continued fatigue, is shown by

the strawberry women, who, during the season, carry a heavy basket on the head twice daily from Twickenham to Covent-Garden, walking upwards of forty miles. Fatigue like this would soon destroy a horse; but these women, who come purposely from Wales and the collieries, endure the labour for weeks without injury or complaint.

The common wood strawberry (which was probably the earliest cultivated) has the leaves rather small, the runners (at the joints of which the new plants are produced) slender, and often of a purple colour. The fruit is small, and generally red, but without much flavour, owing to its being shaded from the sun. When brought out of the shade, or in countries where the influence of the sun is more powerful, both its size and flavour are very much improved; and though not the handsomest, it becomes far from the worst of the cultivated sorts. There is a variety of the wood strawberry a good deal paler, both in the leaves and the fruit, than the one now mentioned, which also ripens later in the season; but it is by no means productive, and is accordingly not much cultivated.

The Alpine strawberry is, in its native situation, a more vigorous plant, and produces larger and more highly flavoured fruit than the common one of the woods. It is often much darker in the colour than any of the other strawberries; and when it is so, the flavour has a sharpness bordering upon austerity.—Still, however, it is an excellent fruit; and it has this advantage, that it continues bearing from June until stopped by the frost; and, in very open seasons, fruit has been gathered from it at Christmas.

The Hautbois was the first known of the larger variety of strawberry. Its history has never been well ascertained, though it has generally been believed to be the mountain strawberry of Bohemia, and to have been first improved by cultivation in France. The hautbois is very productive; and the fruit is highly flavoured, with a peculiar kind of perfume; but some care is necessary in order to prevent the plants from degenerating. The

name of this strawberry is probably derived from the circumstance of the scape which bears the fruit standing higher than the leaves, and, consequently, being called hautbois (high wood). It is not improbable, however, that its original locality in the *high woods* of Bohemia may have suggested the name. In the old gardening books it is written hautboy.

In the early part of the last century, the Alpine strawberry of Chili was introduced into the Royal Gardens at Paris, and from thence found its way over many parts of Europe. It grew to a very large size, and had a finer colour than the hautbois; but in the southern countries of Europe it was soon neglected, because it ran greatly to leaves, produced comparatively little fruit, and what it did produce was deficient in flavour. The "old scarlet strawberry," which was an original introduction from North America, has been an inhabitant of our gardens for nearly two hundred years. The "old black strawberry," an unproductive sort, has been long known in England. The "Chinese" and the "Surinam" strawberries are of considerable antiquity amongst us. The "old pine, or Carolina," has been cultivated and highly prized by the English growers, for many years.

Since attention began to be paid to the culture of strawberries, the number of varieties has been greatly increased. The British strawberries are divided into scarlet, black, pine, hautbois, green, alpine, and wood, according to a classification in a valuable paper in the sixth volume of the 'Horticultural Transactions.' Of these varieties the pine is the most esteemed. It is a native of Louisiana and of Virginia. Its colour is a deep red on both sides; and it is the most rich and highly flavoured of all strawberries, constituting the most valuable variety that has yet been discovered.

The BARBERY (*Berberis vulgaris*).—This tree is a native originally of the Eastern countries, though it is now found in most parts of Europe, where it thrives best upon light and chalky soils. It grew formerly wild, in great quantities, in the hedgerows of England, but has been universally banished, from a general belief that its

presence is injurious to the growth of corn. Duhamel, Broussonet, and other scientific writers, treat this belief as a vulgar prejudice. It should, however, be remarked, that the fructification of the barberry is incomplete, unless the stamens be irritated by insects, when the filaments suddenly contract in a most remarkable manner towards the germ. The flowers are, therefore, by a beautiful arrangement of nature, peculiarly attractive to insects; and thus the barberry may become injurious to neighbouring plants. The berries grow in bunches, and are so very acid, that they are seldom eaten; but with the requisite quantity of sugar, they make an excellent jelly.



a. Elder-berry. b. Cloud-berry. c. Bramble-berry. d. Bilberry.

THE ELDER (*Sambucus*).—The Elder is a native of this country; is very generally diffused; grows with singular rapidity, though it never arrives at great size; and endures the most bleak situations, though in the northern parts of Scotland the fruit seldom ripens. The berries of the elder are fermented into a wine, which, when spiced and drunk warm, is a pleasing winter beverage. They are supposed to contain a portion of the narcotic principle. The black variety is chiefly cultivated for wine-making; but the berries of the yellow

and green are also applicable to this purpose. There is also an elder-flower wine, with a flavour resembling Frontignac.

The elder-tree furnishes the unscientific practitioner of the healing art with many of the most approved remedies; and perhaps not without reason. Boerhaave, the great physician, is said to have regarded the elder with such reverence, for its medicinal virtues, that he sometimes took off his hat in passing a tree of this species.

The BRAMBLE (*Rubus fruticosus*).—Though the bramble is rather annoying with its long trailing stems and its sharp thorns, the fruit, commonly called *blackberry*, is perhaps, in its wild state (and it does not need to be cultivated), among the best, and certainly it is the most abundant, of our native berries. The bramble prefers a soil that is moderately good; but it is found in every situation, except marshes, to the borders of which it creeps very close. On the slopes of the Welsh mountains, more especially in Denbighshire, the bramble-berry grows to the size of a middling gooseberry; and in a dry and sunny autumn is really an excellent fruit. Pliny mentions the malberry growing on a brier, which probably was a fine blackberry. In England there are a number of species confounded under the names of *rubus fruticosus*, and *rubus corylifolius*, that vary very much in the quality of their fruit, some of them really deserving cultivation. The family of brambles is divided into those with upright stems, those with prostrate stems, and those with herbaceous stems.

There is another species of bramble, the Arctic or Dwarf crimson (*Rubus arcticus*). This is a small species, and a native of the coldest regions of the world. Its fruit, however, is exceedingly delicious; and were it possible to cultivate it in any habitable situation, it would be a most important addition to garden berries. We have not heard of its ever having been found either in England or in the Welsh mountains; and in Scotland it grows only in the most wild and elevated situations. Some of the Scottish horticulturists have tried to raise it from the seed, and have, we believe, obtained plants;

though the fruit, when they bore any, has been tasteless, and the plants themselves are preserved alive with difficulty. The arctic berry, which grows in the wildest and most exposed districts of Lapland, sometimes offered to Linnæus the only food which he found in his perilous journey in those dreary regions; and he thus speaks of it with much feeling:—"I should be ungrateful towards this beneficent plant, which often, when I was almost prostrate with hunger and fatigue, restored me with the vinous nectar of its berries, did I not bestow on it a full description."*

CLOUD-BERRY (*Rubus chamaemorus*).—This is another mountainous berry, which it is exceedingly difficult to cultivate. A single berry grows on the top of the stem. These berries are much more numerous than the former, though, like them, they are found only in very elevated and exposed situations—on the sides of the loftiest mountains in Scotland. The berries are about the size of small strawberries, and the flavour is exceedingly fine, superior to that of any of the strawberries, as found wild in this country, and having a sharpness which does not belong even to the best of those which are cultivated. They remain in season for about a month; and, during that time, the Highlanders, in the districts where they are found, (for they are by no means generally diffused over the Highlands,) collect them in considerable quantities, and make them into excellent preserves. In the East, as well as the North, the wild berries of the mountains and valleys, which nature offers in such abundance for a short season, are thus used by man:

"With rich conserve of Visna cherries,
Of orange flowers, and of those berries
That, wild and fresh, the young gazelles
Feed on in Erac's rocky dells."†

In more northern countries the cloud-berry is still more abundant, so much so as to justify the encomium

* Flora Lapponica. † Moore's 'Lalla Rookh.'

passed on it by the poet, while speaking of those 'dreary lands:—

"Ever enduring snows, perpetual shades
Of darkness, would congeal the living blood,
Did not the arctic tract spontaneous yield
A cheering purple berry, big with wine."

In the northern parts of Sweden and Norway, and in Lapland, even to the North Cape, the cloud-berry grows in such abundance as to be an article of extensive commerce. Great quantities of it are sent every autumn to the Swedish capital, and to the southern parts of that country, where they are used in a variety of ways; and, in fact, it forms the principal fruit that they have.

Dr. Clarke notices the value of this berry in his Travels:—"In woods, and moist situations near the river, we found the *Rubus chamamorus* still in flower. The Swedes call it Hiortron; the Laplanders give it the name of Latoch; the inhabitants of Westro-Bothnia call it Snotter; and in Norway its appellation is Multebær. The same plant is found upon some of the highest mountains, and in some of the peat-bogs of the north of England; on which account, perhaps, it is called cloud-berry in our island; but it is not likely that its fruit ever attains the same degree of maturity and perfection in Great Britain as in Lapland, where the sun acts with such power during the summer. Its medicinal properties have certainly been overlooked, owing, perhaps, either to this circumstance, or to its rarity in Great Britain. The fruit is sent in immense quantities, in autumn, from all the north of the Gulf of Bothnia to Stockholm, where it is used for sauces, and in making vinegar."*

Our English traveller, as appears by the following passage, was under greater obligations to the cloud-berry than the Swedish naturalist to the other species of Arctic fruit:—

* Clarke's Travels, vol. ix. pp. 371, 372.

"Mr. Grape's children came into the room, bringing with them two or three gallons of the fruit of the cloud-berry, or *Rubus chamæmorus*. This plant grows so abundantly near the river, that it is easy to gather bushels of the fruit. As the large berry ripens, which is as big as the top of a man's thumb, its colour, at first scarlet, becomes yellow. When eaten with sugar and cream, it is cooling and delicious, and tastes like the large American hautboy-strawberries. Little did the author dream of the blessed effects he was to experience by tasting of the offering brought by these little children; who, proud of having their gifts accepted, would gladly run and gather daily a fresh supply; which was as often blended with cream and sugar by the hands of their mother; until at last he perceived that his fever rapidly abated; his spirits and his appetite returned; and, when, sinking under a disorder so obstinate that it seemed to be incurable, the blessings of health were restored to him, where he had reason to believe he should have found his grave. The symptoms of amendment were almost instantaneous, after eating of these berries."*

THE BILBERRY, or BLEABERRY (*Vaccinium myrtillus*).—This berry grows plentifully on heaths and waste places; and though it does not live in situations as cold as those that have been mentioned, it is very hardy. It is a handsome berry, with a delicate bloom when in perfection; but it is tender, and, when kept for some time, ferments. In some of the pine-forests in Scotland it grows to the height of three feet; and there are places where the pedestrian can pull handfuls of berries as large as the common black currant of the gardens.

Two other species of *Vaccinium*, the black whortleberry, and the red (the cranberry), are common enough in some parts of this country. One, if not both of these, grows most readily in moist situations, such as the dry patches in peat-bogs. Tusser mentions "hartil-berries" amongst the cultivated fruits of his time. These were,

* Clarke's Travels, vol. ix. p. 470, 471.

perhaps, confounded with the fruit of the brambles. "Dewberries" (though supposed by some to be gooseberries) were formerly amongst the delicacies of fruit, if we may judge from the celebrated passage in *Midsummer Night's Dream* :—

"Feed him with apricocks and dewberries,
With purple grapes, green figs, and mulberries."

The red cranberry (*Vaccinium vitis idæa*), of which the berries are excellent, has borne fruit abundantly under cultivation. The berries of the Pennsylvanian *Vaccinium* are very ornamental.

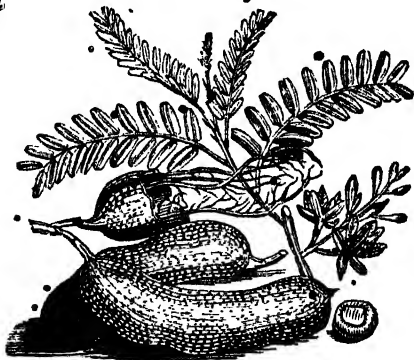
This genus of berry-bearing plants is very abundant in North America, and also in the northern parts of Russia. The American cranberry (*Vaccinium macrocarpon*) forms a considerable article of commerce; and, as does not appear to be the case with some others of the genus, it may be cultivated to advantage on the margins of ponds, and in other moist situations. The importation of cranberries to this country is about 30,000 gallons annually, the duty being sixpence per gallon. This species has been grown in England.

CHAPTER XXII.

TARTARIC ACID—TAMARIND—MALIC ACID—APPLE—
PEAR—QUINCE—MEDLAR—POMEGRANATE.

MANY fruits which contain citric and malic acids contain also tartaric acid. The best example, however, of a fruit containing tartaric acid is the vine. The grape contains also sugar, and it has been already spoken of amongst fruits containing sugar.

Amongst the plants possessing tartaric acid must be placed the tamarind. The fruit contains, in addition to tartaric acid, citric acid.



The Tamarind (*Tamarindus Indica*).

THE TAMARIND (*Tamarindus Indica*).—The tamarind-tree is a native both of the East Indies and of tropical America, and probably also of Arabia and some parts

of Africa. It was very early introduced into this country ; for Gerarde, whose Herbal was published in 1633, makes mention of it as growing here. It does not often flower in England, though it has done so in the Royal Gardens at Kew. It is, however, a common ornament of our hothouses. Where it is a native, it grows to be a large tree, and affords excellent timber—heavy, firm, hard, and durable. The stem is large, covered with brown bark, and divides into many branches ; the leaves are not unlike those of the mountain ash, only they are of a brighter green, and the leaflets are closer to the midrib. The leaflets are small, but the number in a leaf (sixteen or eighteen pairs in a leaf, with an odd one at the extremity) give the tree a very light and elegant appearance. The flowers come out from the sides of the branches in loose bunches, and are followed by the pods, of which there are generally about five or six on a bunch. The pods of the West India tamarinds are, on an average, about three inches long, and contain about three seeds ; those from the East are about double the size.

The pulp, in which the seeds of the tamarind are inclosed, contains more acid than any other vegetable substance, in a natural state, with which we are acquainted ; and therefore it is used both for sharpening food and drink, and for medicinal purposes. Niebuhr says, "The tamarind is equally useful and agreeable. It has a pulp of a vinous taste, of which a wholesome refreshing liquor is prepared ; its shade shelters houses from the torrid heat of the sun, and its fine figure greatly adorns the scenery of the country." Its refreshing properties have given it a place in our poetry :

"The damsel from the tamarind-tree
Had pluck'd its acid fruit,
And steep'd it in water long,
And whoso drank of the cooling draught,
He would not wish for wine."*

Mundello, an old traveller, says, that as soon as the sun

* Thalaka.

is set the leaves of the tamarind close up the fruit to preserve it from the dew, and open as soon as that luminary appears again :

"'Tis the cool evening hour :
The tamarind from the dew
Sheathes its young fruit, yet green." *

The East India tamarinds are preserved without sugar, and therefore they are the best for medicinal use. About forty tons of tamarinds are annually imported into Great Britain.

Of plants containing malic acid, the pomaceous group of the natural order Rosaceæ are most distinguished. To this group belong the apple, the pear, the quince, and the medlar.



a. Apples. b. Pears. c. Quince. d. Medlar.

THE APPLE (*Pyrus malus*).—The apple is distinguished as the fruit of colder climates. It is at once the most brisk and refreshing of any of the common hardy orchard fruits. It remains the longest in season, is used in the greatest number of ways, and therefore is the

* Thalaba.

most generally cultivated. The stone-fruits of the English orchard keep only for a few days, unless they are preserved; and in this state they lose that natural flavour on which their value chiefly depends. Many of the finer pears keep only for a short time, when they become vapid and flat: but there are apples of very rich and vinous flavour, which, with care, can be preserved till the early sorts of the succeeding season come in to supply their place.

The useful qualities of the apple have extended its cultivation throughout Europe, as far as the 60th degree of latitude. It has been observed by a distinguished traveller, that the common fruit-trees, such as apples, pears, cherries, and apricots, grow in the open air, wherever oaks thrive.* As we proceed farther north, the apple is scarcely known. The people of Lapland showed Linnæus what they called an apple-tree, which, they said, bore no fruit because it had been cursed by a beggar woman, to whom the owner of the tree had refused some of its produce. The naturalist found that it was the common elm, a tree also rare in that severe climate.† The apple, as well as most other European fruits, which now appear indigenous, is probably a native of the East. The Prophet Joel, enumerating the trees of Syria, says, "The vine is dried up; and the fig-tree languisheth; the pomegranate-tree, the palm-tree also, and the apple-tree, even all the trees of the field, are withered." The cultivated apple was probably scarce at Rome in the time of Pliny; for he states that there were some apple-trees in the villages near the city which yielded more profit than a small farm. The art of grafting was at that period either very recently discovered, or comparatively little known. This practice must evidently have belonged to an advanced state of civilization. It is remarkable that Moses, in his directions to the Israelites when they "shall come into the land, and shall have planted all manner of trees for food,"‡ makes no mention

* Von Buch's Travels, p. 41. 4to.

† Linnæus's Tour in Lapland, vol. i. p. 23.

‡ Leviticus, xix. 23.

of the art of grafting. Hesiod and Homer, in like manner, have no allusion to a practice which would naturally have formed part of their subject had it existed when they wrote.* The art of grafting, as well as that of pruning, has been ascribed to an accidental origin. The more vigorous shooting of a vine, after a goat had broused on it, is said to have suggested the one great principle in the management of fruit-trees; and it is probable that the occasional natural union of the boughs of distinct trees may have shown the general practicability of the other. Pliny mentions apple-trees "that will honour the first grafters for ever;" and this enthusiastic sort of praise belongs to the infancy of an art, when mankind are first conscious of its blessings, and therefore not disposed to undervalue them through their familiarity. To the facility of multiplying varieties by grafting, is to be ascribed the amazing extension of the sorts of apple, probably from one common stock. The varieties at present known are considerably more than a thousand. Of late years these varieties have been increased in a remarkable manner, by the application of the pollen† of one sort to the blossom of another.

Many of the better sorts of English apples were probably at first introduced into this country from the Continent. The greater part of our names of apples are French, either pure or corrupted. Those varieties which had been celebrated abroad were spread through the kingdom by their cultivation in the gardens of the religious houses; and many of these fine old sorts still exist. Thus the *Nonpareil*, according to the old herbalists, was brought from France by a Jesuit in the time of Queen Mary, and first planted in the gardens of Oxfordshire. The *Oslin*, or *Arbroath pippin*, an ancient Scotch variety, was either introduced or extensively cultivated by the monks of the abbey of Aberbrothwick. On the other hand, the celebrated *Golden Pippin* has been considered as the native growth of England; and noticed as such

* See Goguet, *Origine des Loix*.

† The prolific powder contained in the anther of the flower.

by French and Dutch writers. It is described by Duhamel under the name of "Pomme d'Or; Reinette d'Angleterre." The same celebrated authority on fruit-trees also mentions the "Grosse Reinette d'Angleterre." The more delicate apples, for the table, such as the pippins, were probably very little known here till the latter part of the sixteenth century. Fuller states that one Leonard Maschal, in the sixteenth year of the reign of Henry VIII., brought pippins from over sea, and planted them at Plumstead in Sussex. Pippins are so called because the trees were raised from the pips, or seeds; and bore the apples which gave them celebrity, without grafting. In the thirty-seventh year of the same king we find the larking of apple-trees declared a felony; and the passing of the law had probably a relation to the more extended growth of the fruit through the introduction of pippins. 'Costard-monger' is an old English term for the dealers in vegetables, derived from their principal commodity of apples; the costard being a large apple, round and bulky as the head, *or* 'costard.' If we may deduce any meaning from this name, which is the same as 'coster,' it would appear that the costard, or large apple, was the sort in common use, and that hence the name of the variety became synonymous with that of the species; the more delicate sorts were luxuries unknown to the ordinary consumers of our native fruits, till they were rendered common by the planting of orchards in Kent, Sussex, and other parts of the kingdom.

The growth of the more esteemed apple-trees had made such a general progress in half a century, that we find Shakspeare putting these words in the mouth of Justice Shallow, in his invitation to Falstaff: "You shall see mine orchard, where, in an arbour, we will eat a last year's pippin of my own grafting." Sir Hugh Evans, in the 'Merry Wives of Windsor,' says, "I will make an end of my dinner—there's pippins and cheese to come." Pippins were, therefore, in the time of Shakspeare, delicacies for the dessert. But in another fifty years the national industry had rendered the produce

of the apple an important article of general consumption. The fine cider-orchards of Herefordshire began to be planted in the reign of Charles I. The adaptation of these apples to the soil was quickly discovered; and they spread over the face of the whole country. Of the varieties of the cider-apples, the *Redstreak* and the *Slive* were formerly the most prized: and the cider of these apples, and the perry of the *Squash* pear, were celebrated throughout Europe. At the time when cider was first manufactured in England it was believed that it would almost wholly supersede the use of foreign wines. From the period of the Norman conquest England carried on a great wine-trade with France, principally with Bordeaux and the neighbouring provinces. It increased considerably when Henry II. married the daughter of the Duke of Aquitaine; and after the kings of England subsequently became possessed of some of the great wine provinces of France, the consumption of their produce was almost universal. About the middle of the sixteenth century, although no wines were permitted to exceed the price of twelve-pence per gallon, we find a law enacted, by which no person, except those who could expend a hundred marks annually, or were of noble birth, should keep in his house any vessel of wine exceeding ten gallons,—a regulation which would suggest that the demand for wine was greater than the supply, owing probably to the increase of the middle ranks of society. In the year 1635 we find a patent granted to Francis Chamberlayne, for making wine from the dried grapes of Spain and Portugal; and the patentee set forth that his wines would keep good during several years, and even in a voyage under the line.* This circumstance also shows that the demand for the luxury of wine amongst the commercial classes (who had become of great number and importance, as the political events of those times fully prove) could not be supplied from the wine countries, probably on account of the prevalence of false principles of trade. Cider, therefore, became a general beverage before the

* Rymer's *Fœdera*;—see Pennant's *London*.

time of Charles II., though it had been partially used for nearly a century before. Gerarde, who published his *Herbal*, as already mentioned, about the close of Elizabeth's reign, says, in his quaint way, "I have seen, about the pastures and hedgerows of a worshipful gentleman's dwelling, two miles from Hereford, called Mr. Roger Badnome, so many trees of all sortes, that the servants drink, for the most part, no other drink but that which is made of apples. The qualitie is such, that, by the report of the gentleman-himselfe, the parson hath for tythe many hogsheds of cyder."

During the reigns of William III. and Anne, when there was a constant succession of wars with France, the use of cider was generally inculcated, as tending to the permanent exclusion of the wines of our great rival. Philips, a contemporary of Addison, wrote a long poem in praise of cider; and embodied in his work a good deal of the art of selecting and managing apple-trees. But he wrote as a poet, and maintained the unwise and impolitic doctrine of a nation's wholly depending on its own resources, instead of living in intercourse with its neighbours, and thus advancing the comforts and riches of all. After praising the cider of Hereford, Philips says,

"What should we wish for more? or why, in quest
Of foreign vintage, insincere and mixed,
Traverse the extremest world? why tempt the rage
Of the rough ocean, when our native glebe
Imparts from bounteous womb annual recruits
Of wine delectable, that far surmounts
Gallic or Latin grapes, or those that see
The setting sun near Calpe's towering height?"

We have at length learnt that the truest way to advance the prosperity of nations is, by exchanging the best natural products of one country for those of another. If we are to drink the cider of Hereford in preference to the claret of Bordeaux, for the sole reason that we grow it, the same principle, applied to ourselves by other nations, would cut us off from the greater part of that

commerce with the whole world which constitutes our peculiar superiority. The interests of each individual, and of each country, are best consulted by the facilities with which each can secure a share of the natural advantages and the mechanical skill that belong to the rest. The advice of the well-meaning poet of cider, if acted upon by individuals as well as nations, (and if it be applicable to the one it must be applicable to the other,) would destroy society altogether, by making self the means as well as the end in everything. The freedom of commercial intercourse has no tendency to the repression of internal improvement, but, has a contrary effect. The finest cider and perry of Herefordshire is bought for exportation to the East and West Indies and to America; and this foreign demand for the better sorts keeps up an attention in the cultivators which domestic consumption alone could perhaps not induce.

The Cider counties of England have always been considered as highly interesting. They lie something in the form of a horseshoe round the Bristol Channel; and the best are, Worcester and Hereford on the north of the channel, and Somerset and Devon on the south. In appearance, they have a considerable advantage over those counties in which grain alone is cultivated. The blossoms cover an extensive district with a profusion of flowers in the spring, and the fruit is beautiful in autumn. Some of the orchards occupy a space of forty or fifty acres; and the trees being at considerable intervals, the land is also kept in tillage. A great deal of practical acquaintance with the qualities of soil is required in the culture of apple and pear trees; and his skill in the adaptation of trees to their situation principally determines the success of the manufacturer of cider and perry. The produce of the orchards is very fluctuating: and the growers seldom expect an abundant crop more than once in three years. The quantity of apples required to make a hogshead of cider is from twenty to thirty-four bushels; and in a good year an acre of orchard will produce somewhere about six hundred bushels, or from twenty to twenty-five hogsheads. The

cider harvest is in September. When the season is favourable, the heaps of apples collected at the presses are immense—consisting of hundreds of tons. If any of the vessels used in the manufacture of cider are of lead, the beverage is not wholesome. The price of a hogshead of cider generally varies from 2*l.* to 5*l.*, according to the season and quality; but cider of the finest growth has sometimes been sold as high as 20*l.* by the hogshead, direct from the press—a price equal to that of many of the fine wines of the Rhine, or the Garonne.

The varieties of the apple are so many, and they are so rapidly multiplied, that it would be impossible for us, within our limits, to present any account of them which should be either useful or interesting. The knowledge of varieties is a part, and a very important one, of the science of the practical horticulturist; and one of the most valuable objects which individual growers of fruit, or societies for the encouragement of experiments in cultivation, could propose to themselves, would be to diminish the embarrassing list of varieties, by directing their attention to the best sorts alone. In a great public establishment, such as the gardens of the Horticultural Society, it is perhaps necessary that almost every known variety should be found. Their catalogue presents a list of more than twelve hundred sorts of apple. In the introductory observations to this list, the difficulties produced by this almost unlimited choice are thus noticed:—“A considerable reduction of the names is to be anticipated whenever a general comparison of the varieties can be effected; but, after all the discovery of synonyms that can be expected, the list will remain far more extensive than can be either desirable or useful. No sufficient reduction, however, can effectually take place until a public declaration shall be made of those sorts which are undeserving further cultivation.*

Seeing, therefore, the embarrassing extent of the varieties of the apple in particular, and of fruits generally,

* See a valuable paper on the ‘Formation of a Select Collection of Apple-Trees,’ by Mr. Sabine. Hort. Trans. vol. iii.

and knowing that the progress of experiment is daily adding to their number, we forbear to touch at all upon this branch of the subject. The *general* history of fruits is full of amusing information; and to that, in this work, we must confine our attention.

It has been asserted that many of the fine old varieties of the apple are now going into decay. This may be owing partly to their being more generally cultivated, and consequently grown in a great variety of soils and situations, some of which would suit them, and others not; and that this is the case may be inferred from the fact, that in some places these sorts are to be found healthy enough. There are many theories upon this matter which form subjects of curious inquiry to the practical horticulturist.

American apples are brought into England, as well as many French apples. About twenty thousand bushels is the average amount of the importation.

THE PEAR (*Pyrus communis*).—Amongst the trees which Homer describes as forming the orchard of Laertes, the father of Ulysses, we find the pear.* Pliny mentions several sorts of pears which were grown in Italy, and particularly mentions that a fermented liquor was formed of their expressed juice. It is probable that the Romans brought the cultivated pear to England, and that the monks paid great attention to its varieties. There is a tradition that King John was poisoned in a dish of pears by the monks of Swinsted; and the tale, whether true or false, would imply that the fruit was such as the churchmen would offer to the monarch as a luxury. In an old book of household accounts of Henry VIII., there is an item of twopence “to a woman who gaff the Kyng peres;” and in the time of Gerarde we find that great attention was paid to their growth by the nurserymen in the neighbourhood of London. The old herbalist, after declaring that in his time to write of the sorts of apples and pears, “and those exceeding good,” would require “a particular volume,” adds—“Master Richard Pointer

* *Odyssey*, xxiv. 337.

has them all growing in his ground at Twickenham, near London, who is a most cunning and curious grafter and planter of all manner of rare fruits; and also in the ground of an excellent grafter and painful planter, Master Henry Bunbury, of Touthil-street near unto Westminster; and likewise in the ground of a diligent and most affectionate lover of plants, Master Warner, neere Horsley Down, by London; and in divers other grounds about London." The neighbourhood of Worcester was probably then celebrated, as at the present day, for the cultivation of this fruit, for three pears are borne in the arms of the city. We have already alluded to the manufacture of perry, which is almost peculiar to Worcestershire.

Most of the fine sorts of pears are of Continental origin, the horticulturists of France and the Netherlands having paid more attention to that species of fruit than those of England. As these varieties have retained their original names, a good many laughable corruptions have been produced in their popular nomenclature: in just the same way that "the Boulogne Mouth" is now rendered "the Bull and Mouth." Thus the *Bon Chrétien* is converted into the *Boncrutching*; the *Beurré* into the *Bury*; the *Chaumontelle* into the *Charmingtel*. Such odd names as the *Bishop's-Thumb*, and many others which our fruiterers use, may probably be traced to a similar cause. In the names of apples there is the same corruption,—as *Runnet* for *Reinette*.^{*} The names of fruits in all countries occasionally present some laughable anomalies, such as the "*Bon-Chrétien Turc*," one of the finest of the French pears.

The Chinese, who are said to carry the cultivation of fruit to much greater perfection than the European gardeners, are stated by Marco Polo to have pears, white in the inside, melting, and with a fragrant smell, of the enormous weight of ten pounds each.

The wood of the pear is much firmer than that of the apple, and it is much less liable to be attacked by insects, or to decay. In some of the old orchards, where the apple-trees have wholly disappeared, the pears are in full

vigour and bear abundantly. This is remarkably the case at the old Abbey-garden at Lindores, on the south bank of the Tay, in the county of Fife: disease could have nothing to do with the death of the apple-trees there, as the soil is one of the very best for apples in the kingdom, being fine strong black loam to a great depth. Yet there are many old apple-trees in the kingdom. At Horton, in Buckinghamshire, where Milton spent some of his earlier years, there is an apple-tree still growing, of which the oldest people remember to have heard it said that the poet was accustomed to sit under it. And upon the low leads of the church at Rumsey, in Hampshire, there is an apple-tree still bearing fruit, which is said to be two hundred years old.

The Fruit Catalogue of the Horticultural Society contains above six hundred varieties of the pear; and it is there observed, that "the newly-introduced Flemish kinds are of much more importance than the greater part of the sorts which have been hitherto cultivated in Great Britain, and when brought into use, will give quite a new feature to the dessert."

THE QUINCE* (*Cydonia vulgaris*).—The quince was introduced into Europe, according to Pliny, from the island of Crete. From the largeness of this fruit, and its splendid colour, it is not improbable that it was the same with the apples of the Hesperides; for Galesio, in his treatise on the orange, has shown that the orange-tree was unknown to the Greeks, and that it did not naturally grow in those parts where the gardens of the Hesperides were placed by them. The fruit of the quince, however useful and ornamental it may be in some respects, does not warrant such honours, and in truth has not continued to receive them; for the French, who have paid great attention to its cultivation, particularly for grafting pears upon its stocks, call the quince-tree "*coignassier*," probably, according to Duhamel, because the disagreeable odour of the fruit requires that it should be placed in a corner (*coin*) of the orchard or garden. In the south of France, particularly on the borders of the Garonne, the quince is very extensively grown; and

the peasants prepare from it a marmalade which they call *cotignac*. The term marmalade is derived from the Portuguese name for the quince, *marmelo*. Gerarde says, that in his time quince-trees were planted in the hedges of gardens and vineyards; and marmalade, two centuries ago, seems to have been in general use, principally from a belief that it possessed valuable medicinal properties. The seeds of the quince are still used in medicine, on account of the great quantity of mucilage which they yield to boiling water.

There are eight varieties of the quince noticed in the Fruit Catalogue of the Horticultural Society. Amongst these the Chinese quince (*Cydonia Sinensis*) is inserted on account of the resemblance which its fruit has to that of the common quince; although in France, where only in Europe it has produced fruit, it is not considered eatable. The Chinese quince was introduced into England and Holland nearly forty years ago, and was planted in France about ten years later. The tree has much the appearance of the common quince, as well as the fruit. It is remarkable for the number and brilliancy of its flowers.

Ornamental Crabs.—The crab of Siberia, which had been introduced into this country within the last fifty years, has contributed to the extension of our varieties of apple, by offering a valuable stock for grafting. The fruits thus produced by the union of our richest apples and the Siberian crab are remarkably hardy and luxuriant. The Siberian crab differs in a peculiar manner from our native crab. It furnishes one of the many evidences of the continued influence of original climate upon vegetables, when they are naturalized in another region. The winters of Siberia are intensely cold, the change to summer is sudden, and the heat equally violent. Our own changes of temperature are much slower, and more irregular. Thus, when the native crab scarcely shows signs of life, the Siberian variety puts forth its leaves, blossoms, and bears fruit, early even in an unfavourable season.* The flowers of the Siberian crab are

* See Hort. Trans., vol. i.

beautiful; and its fruit is of a sharp yet pleasant flavour. There are many pretty varieties of *Pyrus*, which are principally cultivated in our gardens for their flowers. The Chinese crab (*Pyrus spectabilis*) is most showy and ornamental. It grows to the height of twenty or thirty feet. Its blossoms are of a pale red, but they are of short duration. Dr. Fothergill is considered to have introduced this native of China, which he cultivated in 1780. The Japan crab or quince (*Pyrus* or *Cydonia Japonica*) was brought here about 1796; but it was described as a very rare plant in the Botanical Magazine of 1803. Its blossoms are of a deep red, and its flowers succeed each other during many months. The white variety of the *Pyrus Japonica* is a yet more recent introduction. It blooms abundantly in April and May; and as it will grow in almost any soil, and may be increased by layers and cuttings, is very valuable as an ornamental tree. The *Pyrus pollveria* (figured in Loddiges' Botanical Cabinet, vol. xi.) is a native of Germany. Its flowers are beautiful, and its fruit not unpleasant. The *Pyrus sulcifolia* is said to have been introduced into this country by Pallas, the celebrated naturalist. He found it in sandy deserts between the rivers Terec and Cuma. It grows also on Caucasus and in Persia. With us it is a small tree, with pendulous branches and beautiful silvery leaves.*

THE MEDLAR (*Mespilus Germanica*).—The medlar is a fruit resembling the smaller apples, and has a good deal of flavour, but is not fit for use until it is very ripe. This ripeness is seldom or never attained while the fruit remains on the tree. It is generally understood to be a native of the south of Europe; but it has been naturalized, though rarely, in the hedgerows in England.

The common medlar is a middle or small-sized branching tree; covered with spines in the wild state, and having ash-coloured bark. In Sicily, according to Miller, it rises to be a large tree, with a straight stem, and the fruit shaped like a pear. The Dutch medlar, which is the kind most cultivated in England, does not reach to a

* Loddiges' Cabinet, vol. xii

great height, and is crooked and unsightly in the branches. The leaves are much larger than those of the common medlar, and they are downy on their under sides. The fruit, also, is larger, and so are the flowers; but it is inferior in pungency and flavour to the smaller sort, which is known by the name of the Nottingham medlar.

The timber of the medlar is very hard and durable. The tree is also rather a slow grower, and lasts to a great age.

The POMEGRANATE (*Punica Granatum*).—Before the peach, the nectarine, and the apricot had travelled from Persia to the more western countries on the borders of the Red Sea, the pomegranate was there assiduously cultivated, and held in the greatest esteem. In the wilderness, when the children of Israel murmured for the fruits of Egypt, they exclaimed, "It is no place of seed, or of figs, or of vines, or of pomegranates." On the borders of the promised land, Moses described it as "a land of wheat, and barley, and vines, and fig-trees, and pomegranates; a land of oil-olive and honey." In the Canticles, Solomon speaks of "an orchard of pomegranates, with pleasant fruits." A tree, therefore, which partakes of the antiquity of the vine, the fig, and the olive—and which, in point of utility, is numbered with the grain-bearing plants, and with honey, all constituting the principal food of the nations of antiquity in their early stages of civilization—must possess a considerable historical interest. It is probable that the pomegranate, differing from the stone-fruits, travelled from the West to the East. Pliny says that it is a native of Carthage, as its name (*Punica Granatum*) imports. Yet as it is found wild in the same botanical regions of Europe—that is, in countries having the same temperature as the northern coasts of Africa—it is probably indigenous there also. It is still common in Barbary (where, according to Shaw, the fruit often weighs a pound, and is three or four inches in diameter*), in the south of France, in Italy, in Spain, and throughout the East. The Jews

* Travels, vol. i.

employ the fruit in their religious ceremonies; and it has entered into the heathen mythology—for in the isle of Eubœa there was formerly a statue of Juno holding in one hand a sceptre and in the other hand a pomegranate.

This general diffusion of the pomegranate throughout the climates suited to it, implies that it possesses highly valuable properties. In hot countries its utility is incontestable; for its juice is most grateful to the palate, and assuages thirst in a degree quite peculiar to it from its pleasant acid—an acid so soft, that the pomegranate may still be called “full of melting sweetness.”* The bark is very astringent, and was anciently employed in dyeing leather; the yellow morocco of Tunis is still tinted with an extract from it. The flowers were also used to dye cloth of a light red. The tree is easily propagated by cuttings.

The pomegranate-tree attains the height of about twenty feet. The branches are thick, and in some of the varieties they are armed with spines. The leaves, which are of a beautiful green, stand opposite, and are about three inches long, and half an inch broad in the middle. The flowers come out at the end of the branches; they are sometimes in clusters of three or four, and the times of their blowing are so irregular, that the succession is often continued for months. The petals are handsome, very thick, and fleshy. The beauty of the tree, independently of its fruit, has caused it to be planted for ornament in the south of Europe and in the East. “The nightingale,” says Russel, in his account of Aleppo, “sings from the pomegranate-groves in the day-time.”

In England the fruit very seldom arrives at maturity; but the tree is highly prized as an ornament, the flowers being of a bright scarlet colour, and (especially the double ones) very handsome. Their odour, too, is as fragrant as their colour is bright. The longevity of the pomegranate-tree is remarkable. At Paris, and at Ver-

sailles there are specimens which are distinctly ascertained to have existed more than two centuries. The pomegranate, even at Paris, will not bear exposure in the open air too early in the spring; but it is not quite so delicate as the orange, and is therefore generally removed from the houses eight or ten days earlier.

It is stated that the pomegranate was first cultivated in England in the time of Henry VIII. Gerarde says he reared several plants from the seeds, and it is mentioned amongst the trees that bore fruit in the orangery of Charles I.

CHAPTER XXIII.

THE PEACH, NECTARINE, APRICOT, PLUM, CHERRY, AND
LOVE-APPLE.



a. Peach. b. Nectarine. c. Apricot. d. Almond.

IN connexion with the fruits belonging to the natural order *Rosacea*, those belonging to the *Amygdaleous* group of that order may be mentioned here—the peach, nectarine, cherry, plum, &c. Their fruits contain tartaric and malic acids; and on account of their hardened endocarps, they are commonly called stone-fruits.

The principal stone-fruits that are valued chiefly as fruits, without any reference to their other qualities, are the peach and nectarine, which are only varieties of the same species, the almond, the apricot, the plum, and the cherry. The first belong to the Linnæan genus *Amygdalus*, and the latter to that of *Prunus*.

It seems doubtful whether the almond, however different it is in its fructification, is not the same species with the peach. * The identity of the peach and the nectarine has been fully established. Specimens raised from the stone have not only borne fruit, having on one part of the tree the downy coat of the peach, and on another the smooth coat of the nectarine, but they have exhibited varieties even closer than that, for single fruits have been produced with the coat of the peach on the one side, and that of the nectarine on the other.* The identity of the apricot and the plum was also believed by the elder gardeners.

The PEACH and NECTARINE.—Of the *Peach* (*Amygdalus Persica*) there are two distinct varieties, although there is but little difference in the appearance of the trees, and hardly any in that of the blossoms: these are, the peach, with a downy coat, and the nectarine with a smooth one. Of what country the peach actually is a native, it is impossible to ascertain. From the distinctive name *Persica*, bestowed upon it by the Romans, it is very evident, and Pliny expressly states, that they imported the peach from Persia; but whether it was indigenous to Persia, or sent thither from a country still nearer the equator, we have no information. When growing in its natural state, the peach is rather a small tree, with wide-spreading branches. The flowers appear before the leaves; they are of a very delicate colour, but of scarcely any scent. The fruit is roundish, with a furrow along one side, and having a very delicate downy cuticle when ripe. Peaches are distinguished into two classes; those which separate easily from the stone or nut, and those which do not. The former are, generally speaking, the best flavoured, though to that there are exceptions. The varieties of the peach are exceedingly numerous, but of late years as many new peaches have probably not been introduced as there have been new varieties of some other fruits. There are upwards of two hundred varieties inserted in the Fruit Catalogue of

* See Hort. Trans., vol. i.

the Horticultural Society. The qualities of the peach appear to depend a good deal upon the soil and climate in which it has for a considerable time been cultivated; and the soil in which the tree is immediately planted should neither be too rich nor too poor,—the former causing the trees to make too much wood, and the latter making the fruit hard and deficient in flavour.

Of the history of the nectarine as little is known as that of the peach; neither is it ascertained which of them was the variety first cultivated. Delicious as the peach is, the nectarine, when of a good sort, and properly cultivated, is superior to it, and though it wants the lusciousness of some of the tropical fruits, perhaps few vegetable productions are more grateful to the palate even of the epicure.

In the warmer parts of Asia the peach is very generally cultivated, and in many it grows abundantly without culture.

On some parts of the American continent, also, the peach grows readily and in great plenty. Capt. Head, in his 'Rough Notes,' mentions the beauty and productiveness of the peach-trees which are scattered over the corn-fields in the neighbourhood of Mendoza, on the east-side of the Andes, and the same traveller notices dried peaches as an article of food in the mountainous parts, to which they must, of course, be carried from the plains.

In many parts of the United States peach-trees grow in extensive plantations. They continue without culture; and the fruit is of little value, except in the distillation of peach-brandy and the fattening of hogs. The following account of the peach-orchards in the United States was communicated to the Horticultural Society in 1815, by Mr. John Braddick, of Thames Ditton:—

"Some years ago, when travelling through Maryland, Virginia, and the neighbouring provinces of the United States of America, I had an opportunity of observing the mode in which the peach-trees of those provinces were cultivated, which was invariably from the stone of the peach, the plant being never budded, but always remain-

ing in a state of nature.' In the middle and southern provinces of the United States, it is no uncommon circumstance for a planter to possess a sufficient number of peach-trees to produce him, after fermenting and distilling the pulp, from fifty to one hundred gallons of peach-brandy; the manufacturing of this liquor, and the feeding of hogs, being the principal uses to which the peach is applied in those countries. A peach-orchard usually contains a thousand or more standard trees. The tree being raised in the manner I have detailed, it is easy to conceive that the fruit growing on them must be an endless variety, scarcely two trees producing exactly alike; and although by far the greater number of trees, in any of these orchards, will always be found to produce fruit below mediocrity in point of flavour, yet a judicious observer will never fail, among so great a number, to pick out a few trees, the race of which may be considered worthy of preserving."

The peach is said to have been first cultivated in England about the middle of the sixteenth century. Gerarde describes several varieties of peach as growing in his garden. Tusser mentions it among his list of fruits in 1557. *

In the neighbourhood of Paris much attention is paid to the culture of peach-trees, and the peaches there are of excellent quality. The principal gardens for the supply of the French capital are at Montreuil, a village near Paris; and one tree there sometimes covers sixty feet of wall, from the one extremity to the other. The Montreuil peaches are of the finest flavour; and their excellence is properly attributed to the exclusive attention of the people to their culture. The subdivision of labour and skill produces the same results in every art.

The espalier peaches of the Duc de Praslin, near Melun, are stated to be the finest in Europe.*

All the peaches have in the kernel a flavour resembling that of the noyau, which depends on the presence of prussic or hydrocyanic acid. The leaves have the

* Le Bon Jardinier, 1829.

same flavour, which they impart by infusion either in water or in spirits.

The facility of raising the peach from the stone has probably tended to its general diffusion throughout the world. This fruit has steadily followed the progress of civilization; and man, "from China to Peru," has surrounded himself with the luxury of this, and of the other stone-fruits, very soon after he has begun to taste the blessings of a settled life. There are still spots where ignorance prevents portions of the human race from enjoying the blessings which Providence has everywhere ordained for industry; and there are others where tyranny forbids the earth to be cultivated and produce its fruits. The inhabitants of the Haduran, who are constantly wandering, to escape the dreadful exactions of some petty tyrant, have neither orchards nor fruit-trees, nor gardens for the growth of vegetables. "Shall we sow for strangers?" was the affecting answer of one of them to Burckhardt.

Even in the same land there is a striking contrast between such scenes as Burckhardt thus describes, and the effects of a settled industry, proceeding from a peaceful security. Dandini, in remarking the richness of Western Syria, observes, "that it is to an industry less harassed by predatory encroachments than that of any other part of Syria, that the hills of Lebanon owe those fine terraces, in long succession, which preserve the fertile earth; those well-planted vineyards; those fields of wheat raised by the industrious hand of the husbandman; those plantations of cotton, of olives, and of mulberries, which present themselves everywhere in the midst of the rocky steeps, and give a pleasing example of the effects of human activity. The clusters of grapes are enormous, and the grapes themselves as large as cherries."

One of the greatest blessings that can be conferred upon any rude people (and it is a blessing which will bring knowledge, and virtue, and peace, in its train) is to teach them how to cultivate those vegetable productions which constitute the best riches of mankind. The traveller Burchell rendered such a service to the Bacha-

pins, a tribe in the interior of Southern Africa. He gave to their chief a bag of fresh peach-stones, in quantity about a quart; "nor did I fail," says the benevolent visitor of these poor people, "to impress on his mind a just idea of their value and nature, by telling him that they would produce trees which would continue every year to yield, without further trouble, abundance of large fruit of a more agreeable flavour than any which grew in the country of the Bachapins." This is an interesting example of how much good a right-minded and active individual may do to his humbler brethren of the human family. "Why have not everywhere the names been preserved," says Humboldt, "of those who, in place of ravaging the earth, have enriched it with plants useful to the human race?" It is satisfactory to observe, however, that when men are highly civilized, there is an elasticity in their mental energies, which makes the destruction of tyranny and war of less permanent injury than when their inflictions fall upon a rude people. Sickler, a distinguished naturalist of Germany, who has paid particular attention to the cultivation of fruit-trees, had, in the Duchy of Saxe-Gotha, formed three nurseries for fruit-trees, one of which contained eight thousand grafted plants. In 1806 this nursery was entirely destroyed by the French, after the battle of Jena: Ney's corps bivouacked in it. After the battle of Leipsic, in 1814, another nursery, planted by the same eminent man, was destroyed by the Cossacks. Yet in 1817 he had planted and reared a third nursery with his own hand—persevering, in spite of the injuries which he had received in these dreadful contests, to distribute his fine plants and the knowledge of their cultivation over his native country.* The labours of such a man will endure when the fame of conquerors is forgotten, or thought worthless, or only remembered to be hated as it deserves.

It has been already stated that some doubts exist as to

* See an interesting memoir of Sickler in the Hort. Trans.

the difference between the peach and the almond being more than apparent. With reference to this subject, there is a curious fact recorded by the President of the Horticultural Society. The fruit of a sweet almond-tree, which had been obtained from an almond kernel that had, when in flower, been impregnated with peach pollen, was sown, and produced a tree: this tree bore eight peaches, some of which were perfect, and the others burst at the centre when ripe, as is the case with almonds. The peaches were finely formed and coloured; the flesh white, soft, melting, and of good flavour. This experiment is curious; for though it does not completely establish the fact of the convertibility of an almond into a peach, it does so in great part, by showing that only the pollen is necessary to effect such a change.

The *Flat Peach of China* is perhaps the most singular of the peach tribe. The size of it resembles that of the apple; and the stalk and eye approach so near as to give it the appearance of a ring of flesh, with a stone in the middle. The following description accompanied specimens presented to the Horticultural Society by Mr. Braddick:—

“This fruit is of truly singular form, and perhaps will be best described as having the appearance of a peach flattened by pressure at the head and stalk; its upright diameter, taken through the centre, from eye to stalk, being eleven-sixteenths of an inch, consisting wholly of the stone, except the skin; that of its sides is one inch and one-eighth, its transverse diameter being two inches and a half. The head of the fruit is crooked in such a manner as to look like a broad and rather hollow eye of an irregular and five-angled (or lobed) shape, surrounded by the appearance of the remains of the leaves of a calyx: the whole surface of this eye is roughly marked with small irregular warty lines, like the crown of a medlar. The colour of the skin of the fruit is pale yellow, mottled, or rather speckled, with red on the part exposed to the sun, and covered with a fine down. The flesh is pale yellow, having a beautiful radiated circle of fine red surrounding the stone, and extending far into the fruit. The

stone is flatly compressed, small, rough, and irregular. The consistence and flavour of the flesh is that of a good melting peach, being sweet and juicy, with a little noyau flavour, or bitter aroma. This peach is cultivated in China, representations of it being continually seen on the papers and drawings received from that country; and it is well known at Canton, where it is esteemed as a good fruit."

THE APRICOT (*Prunus Armeniaca*).—The apricot belongs to a very numerous genus of fruit-bearing trees, and trees which are a good deal different in their characters. The genus *Prunus* comprises all the varieties of the cherry, the laurels properly so called, the plums, the sloe, and a number of others that are never cultivated for the sake of their fruit. Many of the genus are poisonous; and though the fruit of some of them is agreeable to the taste, and safe enough when taken in limited quantities, there is none of the family that can be indulged in to excess with impunity. Cosumella says that the Persians sent the peach to Egypt to poison the inhabitants; and a species of apricot is called by the people of Barbary "matza Franca," or the killer of Christians.* All these evil qualities are, however, destroyed by cultivation; for it is the privilege of man not only to distinguish between the good and evil properties of vegetables, but to eradicate the evil, in many cases, by his skill and industry.

The apricot is very widely diffused in Asia, and grows upon the slopes of the sterile mountains westward of China. Many species of it are cultivated; and, as they ripen earlier than the peach and nectarine, they are in considerable estimation. Some varieties are exceedingly delicious; and the Persians, in their figurative language, call the apricot of Iran "the seed of the sun."

It should seem that the apricot was known in Italy in the time of Dioscorides; and that it got its name *precocia* from ripening earlier than some other fruits. The modern Greek name, *περικυκκα* is very like the Arabic

* Shaw.

name *berikach*. The Romans set little value upon the apricot, as appears by an epigram of Martial. If the ancient name is to be retained, a-precake, as it used to be styled by our most early writers on horticulture, is the classical appellation, and the modern apricot the vulgarism or corruption.

The apricot is said to derive its scientific name from its almost covering the slopes of the Caucasus, the Ararat, and the other mountains in and about Armenia, up almost to the margin of the snow. The general opinion that it is a native of Armenia has, however, been controverted by M. Regnier, a French naturalist, who contends, that as Armenia is a high mountainous country, the climate of which resembles that of middle Europe, it cannot possibly be the country of a tree which begins to flower so early that its blossoms are often destroyed by the frost notwithstanding every care of the cultivator. The apricot, too, although it has been cultivated in Europe for many ages, never sprang up from seeds in any of our forests; neither has it been found wild either in Armenia or any of the neighbouring provinces. M. Regnier is of opinion that it is a native of Africa, and that its limits appear to be a parallel between the Niger and the range of the Atlas mountains, from whence it has, by cultivation, been carried towards the North.

Apricots are very plentiful, and in great variety, in China; and the natives employ them variously in the art. From the wild tree, the pulp of whose fruit is of little value, but which has a large kernel, they extract an oil; they preserve the fruit wet in all its flavour; and they make lozenges of the clarified juice, which afford a very agreeable beverage when dissolved in water. The apricot attains the size of a large tree in Japan. It also flourishes in such abundance upon the Oases, as to be dried and carried to Egypt as an article of commerce. In those sultry climates the flavour is exquisite, though the fruit is small.

Gough, in his *British Topography*, states that the apricot-tree was first brought to England, in 1524, by



a, Plum. b, Cherry.

Woolf, the gardener to Henry VIII. Gerarde had two varieties in his garden.

THE PLUM (*Prunus domestica*).—The plum appears to be still more widely diffused in its original locality than the apricot; and it is much more prone to run into varieties. It is a native of Asia, and of many parts of Europe; and even grows wild in the hedges in some parts of Britain, though possibly it may have found its way there from some of the cultivated sorts, and have degenerated. The plum, and almost all its species, is very apt to run under ground, and produce suckers from the roots. Duhamel says that if plums are grafted low, and covered with earth, they push out shoots which may be transplanted.

Plums of various sorts appear to have been introduced into England as early as the fifteenth century. These varieties came to us from France and Italy. The "Greengage" is the *Reine Claude* of France, so called from having been introduced into that country by the wife of Francis I. It is called Gage in England, after the name of the family who first cultivated it here. The "Orleans" probably came to us when we held possession of that part of France from which it takes its name. Lord

Cromwell introduced several plums from Italy, in the time of Henry VII. The damson, or damascene, as its name imports, is from Damascus.

In some countries, particularly in Alsatia, a considerable quantity of alcohol is produced from plums and cherries by fermentation. Dried plums form a large article of commerce, under the name of prunes and French plums.

There are nearly three hundred varieties of plums, many of which are, perhaps, only dissimilar in name. The Washington, a modern variety, which is stated in the Pomological Magazine not to be surpassed in richness of flavour, beauty, and other good qualities, by any, is curious in its origin. The parent tree was purchased in the market of New York, some time in the end of last century. It remained barren several years; till, during a violent thunder-storm, the whole trunk was struck to the earth and destroyed. The root afterwards threw out a number of vigorous shoots, all of which were allowed to remain, and finally produced fruit. It is, therefore, to be presumed that the stock of the barren kind was the parent of this. Trees were sent to Mr. Robert Barclay, of Bury Hill, in 1819; and in 1821 several others were sent to the Horticultural Society by Dr. Hosack.

THE CHERRY (*Prunus Cerasus*).—The Cherry is a native of most temperate countries of the northern hemisphere. The small black is found not only in some parts of England, but even in places among the Scottish mountains, where it would be difficult to imagine them to have been carried. It is generally said that the first of the present cultivated sorts was introduced about the time of Henry VIII., and were originally planted at Sittingbourne, in Kent. The cherry-orchards of Kent are still celebrated. It seems, however, that they were known much earlier, or, at any rate, that cherries were hawked about London before the middle of the sixteenth century, in the very same manner as at present. The commencement of the season was announced by one carrying a bough or twig loaded with the fruit. Our present popular song of "Cherry ripe, ripe, I cry," is very slightly

altered from Herrick, a poet of the time of Charles I. One of our old English games, *cherry-pit*, consisted of pitching cherry-stones into a little hole :—" I have loved a witch ever since I played at cherry-pit."* Shakspere also alludes to the same custom.

The wild cherry, of which there are a good many varieties, is a much more hardy tree than any of those that produce the finer sorts of fruit ; and it is therefore much cultivated for stocks upon which to graft the others, as trees so grafted attain a larger size, are more durable, and less subject to disease. At some of the ruined abbeys and baronial castles there are found cherry-trees, chiefly black ones, which have attained the height of sixty or eighty feet, and continue to produce great quantities of fruit. These ancient sorts are not confined to the warmer parts of the country, but are met with in some of the northern counties of Scotland. Evelyn ranks the black cherry amongst " the forest berry-bearing trees, frequent in the hedges, and growing wild in Herefordshire, and many places."

The cherry is generally understood to have been brought to Rome, from Armenia, by Lucullus, the conqueror of Mithridates. This was about sixty-eight years before the Christian era ; and such was the fondness for the fruit, that, Pliny says, " in less than one hundred and twenty years after, other lands had cherries, even as far as Britain beyond the ocean." The cherry is spread over Africa. In Barbary it is called " The Berry of the King." Desfontaines (*Histoire des Arbres*) contends, in opposition to the received opinion, that the wild cherry is indigenous to France, and of equal antiquity with the oak ; nor can we help thinking, from the situation in which we have seen wild cherries, that the same may be the case with parts of the United Kingdom.

The transplantation of fruit-trees from one distant locality to another has been employed by Hume as an argument to prove " the youth, or rather infancy, of the world," in opposition to the opinions of those who

*. Witch of Edmonton.

maintain that this earth has existed, in its present condition, from countless ages :—

“ Lucullus was the first that brought cherry-trees from Asia to Europe ; though that tree thrives so well in many European climates, that it grows in the woods without any culture. Is it possible, that, throughout a whole eternity, no European had ever passed into Asia, and thought of transplanting so delicious a fruit into his own country ? Or if the tree was once transplanted and propagated, how could it ever afterwards perish ? Empires may rise and fall ; liberty and slavery succeed alternately ; ignorance and knowledge give place to each other ; but the cherry-tree will still remain in the woods of Greece, Spain, and Italy, and will never be affected by the revolutions of human society.

“ It is not two thousand years since vines were transplanted into France ; though there is no climate in the world more favourable to them. It is not three centuries since horses, cows, sheep, swine, dogs, corn, were known in America. Is it possible, that, during the revolutions of a whole eternity, there never arose a Columbus, who might open the communication between Europe and that continent ? We may as well imagine that all men would wear stockings for ten thousand years, and never have the sense to think of garters to tie them. All these seem convincing proofs of the youth, or rather infancy, of the world ; as being founded on the operation of principles more constant and steady than those by which human society is governed and directed. Nothing less than a total convulsion of the elements will ever destroy all the European animals and vegetables which are now to be found in the western world.”

Several liqueurs are manufactured from cherries. A large black cherry (*Marise noire*) is used in the composition of the *Ratafia* of Grenoble ; and the *Maraschino* of Zara is prepared from a particular species of cherry cultivated in Dalmatia. *Kirschwasser*, which is a cheap spirit, forming a considerable article of commerce, is the fermented liquor of a small black cherry.

The whole of the genus *Prunus* yield what is com-

monly called gum; that of the cherry-tree being the best. But, this substance, which is called *cerassin*, resembles *tragacanth* (the gum of the *Astragalus*), and is therefore improperly called gum, as the term is usually understood and applied to gum-Arabic.

There are about two hundred and fifty varieties of cherries cultivated in England.

The Chinese cherry (*Prunus pseudo-cerasus*) is a valuable new species of that fruit, introduced into this country so recently as 1919. The following is an extract from the account of this variety, presented to the Horticultural Society by Mr. Knight, their President:—

“I received a plant of the Chinese cherry from the garden of the Horticultural Society in the summer of 1824, after it had produced its crop of fruit; and it was preserved under glass, and subjected to a slight degree of artificial heat till the autumn of that year. It appeared very little disposed to grow; but produced one young shoot, which afforded me a couple of buds for insertion in stocks of the common cherry. Soon after Christmas the tree was placed in a pine-stove, where it presently bloomed abundantly, and its fruit set perfectly well, as it had previously done in the gardens of the Society, and it ripened in March. The cherries were middle-sized, or rather small compared with the larger varieties of the common cherry; were of a reddish amber colour, very sweet and juicy, and excellent for the season in which they ripened. The roots of the tree were confined to rather a small pot, and the plant was not even in a moderately vigorous state of growth. I, therefore, infer that the fruit did not acquire either the size or state of perfection which it would have attained if the tree had been larger, and in a vigorous state of growth, and the season of the year favourable.”

CHAPTER XXIV.

VARIOUS FRUITS, CONTAINING VEGETABLE ACIDS, SUGAR,
STARCH, PROTEIN, AND VOLATILE OILS.

THE PINE-APPLE (*Bromelia*).—The earliest exchanges of tropical plants that took place between the Portuguese in the East, and the Spaniards in the West, have not been recorded with perfect accuracy, so that we are not absolutely certain that the pine-apple may not be a native of some parts of Asia, and even of Africa, as well as of America. That it is a native of the West is certain, however, as all the varieties, except some of the trivial ones arising from cultivation, are found wild on the continent, or the islands of that quarter of the world.

The *Ananas*, or pine-apple, properly so called, is now so generally known in this country (being cultivated in hot-houses and pits almost from Cornwall to Caithness), that no minute account of it is necessary. When of a good sort and healthy, it is accounted the best, at least the most luscious, fruit that this country produces; and, with careful cultivation, is equal in quality to that of places where it is a native. It is said even to be superior, because the English gardeners may, by skilful treatment and choice of sorts, more than make up for the want of sun and the deficiency of natural temperature.

It has been said that the pine-apple was brought from Brazil, first to the West Indies, and thence to the East; but the evidence is not complete. It was known in Holland some time before its introduction into this country; and even about its introduction here there are some disputes. The picture of King Charles II., with his gardener presenting him with a pine, said to be the first grown in England, is rejected by the better informed authorities; and the pine, if ever such a fruit was

offered to that monarch, is supposed to have been brought from Holland, or the pine to have been presented, and the picture drawn, before his return to this country. Mr. Bentinck, the ancestor of the Duke of Portland, is, according to the best accounts, supposed to have first introduced and cultivated the pine in the year 1690; and this is rendered the more likely, from the fact that he was previously acquainted with the fruit in Holland. And yet the cultivation of the pine had made so little progress in England a quarter of a century later, that Lady Mary Wortley Montagu, on her journey to Constantinople in 1716, remarks the circumstance of pine-apples being served up in the dessert, at the Electoral table at Hanover, as a thing she had never before seen or heard of.*

Pine-apples have been grown in this country of an extraordinary size. One of the New Providence kind, that weighed nine pounds four ounces, was presented to his Majesty, in June, 1820, by John Edwards, Esq., of Rûcola, Glamorganshire, where it was grown. In July, 1821, another Providence pine is mentioned, in the Transactions of the Horticultural Society,† to have weighed ten pounds eight ounces: it was grown by Mr. Buchan, gardener to Lord Cawdor, at Stackpool Court, Pembrokeshire. It was ten inches and a half high, exclusive of the crown and stalk, and twenty-two inches in circumference. From the extraordinary size and beauty of the fruit, it was thought proper by the Fellows of the Horticultural Society to present it to his Majesty, which was accordingly done; and it was served up in the dessert at the royal table at the Coronation banquet. Mr. Buchan raised three other pines of extraordinary weight in the same season: one weighed ten pounds six ounces; another, ten pounds two ounces; and a third, nine pounds eight ounces; making the total weight of the four, forty pounds eight ounces.

In the Indian Archipelago, and in China, an extraordinary monstrous state of the pine-apple is sometimes

* Letters of Lady M. W. Montagu. † Vol. v. p. 264.



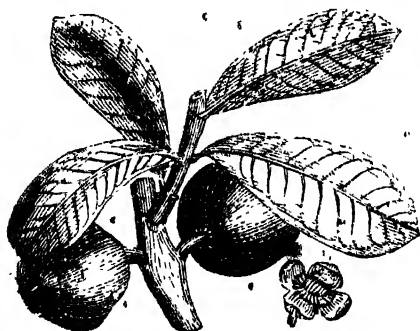
Many-headed Pine.

seen, called "the many-headed pine." It is caused by the plant producing branches bearing fruit at each point where, under common circumstances, it produces single flowers. There are fine specimens preserved in spirits in the Library of the Horticultural Society, and the plant itself is in their garden.

Pine-apples are now regularly imported into this country from South America, where they are cultivated for the European market. This has placed the pine-apple within the reach of almost all classes of consumers, and that which a few years ago was seen only occasionally on the tables of the rich, may be purchased for a few pence at the corners of our streets. The foreign pine-

apples, however, have not so fine a flavour as those grown in our own hothouses.

The MAMMEE (*Mammea Americana*).—The mammee is a native of the West Indies, where it grows to a large tree, sixty or seventy feet in height. It is a handsome straight-growing tree, with a spreading head, and the leaves are oblong and obtuse, with very many, fine, closely set, parallel veins. The fruit of the mammee is yellow, not unlike one of the largest russet apples, either in shape or in size. The skin, which easily peels off, and the seeds, of which there are two or three in the centre, are resinous, and very bitter; but the pulp under the skin, which, when ripe, is of a deep yellow, resembling that of the finest apricot, and of considerable consistency, is very fragrant, and has a delicious flavour. To people with weak stomachs it is said to be more delicious than healthful; but still it is highly prized, very abundant in the West Indian markets, and accounted one of the best native fruits they have. The mammee was found by Don in the vicinity of Sierra Leone; but whether native there, or imported from America, cannot be ascertained. It was introduced into England in 1735.



Mammee.

THE ALLIGATOR PEAR (*Laurus Persea*).—The Avo-



Alligator Pear.

cado, or Alligator Pear, grows upon a tree about the size of the common apple. It is a native of the West Indies. The leaves are oblong and veiny, the flowers of a yellowish green colour, and the fruit, which is the size of a large pear, is considered the most delicious in the world. It contains a kernel, inclosed in a soft rind; and the yellow pulp, which is firm, has the delicate rich flavour of the peach, but infinitely more grateful. It is sometimes called Vegetable Marrow, and is eaten with pepper and salt. It appears necessary, on account of the richness of the pulp, to apply some spice or acid, and thus lime-juce is also frequently added to it, mixed with sugar. Of the three kinds, the red, the purple, and the green, the last is the best. The fruit is eaten with avidity, not only by men, but by birds and quadrupeds.

The ANCHOVY PEAR (*Grias cauliflora*).—The Anchovy pear is a fruit also much esteemed in the West Indies, of which islands it is a native. The tree on which it grows is tall, upright, and handsome; rising to the height of about fifty feet, with leaves two or three feet long. It bears large whitish flowers, that come

from the stem; and these are followed by the fruit, which is of considerable size, brownish, having a kind of pulp over a single oval kernel. The fruit very much resembles the mango in taste; and, like that, it is often made into pickles before it is ripe. The tree grows in the moist parts of Jamaica, and other places of the West Indies; where, in addition to the value of its fruit, it is a highly ornamental tree. It may be reared in England, by the joint efforts of bark and the heat of a stove, as is done with the pine-apple. In the West Indies it grows readily from the kernel, and is often cultivated in clumps.



Anchovy Pear.

The CUSTARD-APPLE (*Anona muricata* and *Anona squamosa*).—Ten or twelve species of the custard-apple are enumerated. They are natives of the tropical parts of Africa, Asia, and America; but the better sorts are more abundant in the last part of the globe.

The *Sour-sop*, rough custard-apple (*Anona muricata*), is a middle-sized tree, growing abundantly on the savannas in Jamaica; and bearing a large oval fruit of a greenish yellow colour, covered with small knobs on the outside, and containing a white pulp, having a flavour



Custard Apple.

compounded of sweet and acid, and very cooling and agreeable. It is, however, too common to be much esteemed by the wealthier people, though it is much sought after and relished by the negroes. The odour and taste of the whole plant are very similar to those of the black currant. It was early introduced into England, but has not come into cultivation as a fruit-tree.

The *Cherimoyer* (*Annona cherimolia*) is a native of the continent of America; and in Peru it is accounted one of the best fruits they have. Humboldt speaks of it with high praise; but Feuillée, another traveller in South America, says a European pear or plum is worth all the Cherimoyers of Peru. The tree which produces this fruit has a trunk about ten feet high; the leaves are oval, and pointed at both ends; the flowers are solitary, very fragrant, and of a greenish colour; the fruit of considerable size, somewhat heart-shaped, rough on the outside, and greyish brown, or even nearly black, when ripe. The flesh, in which the seeds are contained, is soft, sweet, and pleasant, and highly esteemed both by natives and foreigners. It has been introduced into England for about a century, but not cultivated as a

fruit-tree. In the south of Spain it is occasionally found in gardens, where it bears its fruit as an orchard-tree.

The *Sweet-sop* (*Anona squamosa*) is a very small tree, being, in many situations, little better than a bush. It is found both in the East and the West Indies. The fruit is almost the size of the head of an artichoke, scaly, and of a greenish yellow colour. The rind is strong and thick; but the pulp is delicious, having the odour of rose-water, and tasting like clotted cream mixed with sugar. It is, like many other fruits, said to have a much finer flavour in the Indian Archipelago than in the West Indies. It, too, was early known in England, but has not become general.

The *Alligator apple* (*Anona palustris*) grows wild in the marshes of Jamaica. The fruit is shining and smooth in appearance, and sweet and not unpleasant to the taste; but it is a strong narcotic, and, therefore, not generally eaten. One thing worthy of remark is, that the wood of the alligator apple-tree is so soft and compressible, that the people of Jamaica call it cork-wood, and employ it for stoppers.

WILD PLUMS (*Achras*).—There are various species of the wild plum in the West Indies, some of them timber-trees of large dimensions; but those most valued for their fruit are the sappodilla plum (*Achras sapota*) and the maiminee sapota (*Achras mammosa*).

The *sappodilla plum* is a large and straight tree, which runs to a considerable height without any branches, with a dark grey bark, very much chapped. The leaves are smooth and beautiful, and the flowers white and bell-shaped. The fruit resembles a bergamot pear in shape and size, but in colour is like a medlar, and is similar also to that, in being eaten when it is beginning to decay.

The *mammee sapota* grows on a much smaller tree, with larger leaves and flowers of a cream-colour; the fruit about the same size as the former, but brownish when ripe, and containing a pulp resembling marmalade of quinces in consistency, and of a very delicious flavour. On account of this the tree is sometimes called the mar-

malade-tree, and is, in all probability, the same which Stedman, in his account of Surinam, call the *marthalade box*. It is a native of the West Indies and the adjoining coast, and is very much cultivated in the gardens there, for the sake of its fruit.

STAR-APPLE (*Chrysophyllum Cainito*).—This is also a native of the West Indies. It grows on a moderately-sized spreading tree, with slender, flexible branches. There are some species, or, at least, varieties of the fruit. The star-apple, properly so called, bears fruit resembling a large apple, which, in the inside, is divided into ten cells, each containing a black seed, surrounded by a gelatinous pulp. The West Indian damson-plum has small fruit, and is chiefly found in the woods. The milky juice of the star-apple, both of the tree and the fruit, before it is ripe is remarkably astringent; but when the fruit ripens, it is sweet and very agreeable to the taste.

MELON-THISTLE, TORCH-THISTLE, CREEPING CEREUS, INDIAN FIG, OR PRICKLY PEAR (*Cactus*).—The *cactus* is a very large and very singular genus of vegetables. With the exception of, perhaps, one species, the common prickly pear, which is found in the south of Europe, in Barbary,* and in some parts of North America, they are all natives of the West Indies. In the warmer parts of the American continent they are found growing upon the bare rocks, without soil, and apparently, in many instances, without humidity. The leaf-like stems are thick, succulent, generally covered with spines; and the individual masses, which are often fantastically joined together by narrow necks, have some resemblance to the fruit of the cucumber. These stems or leaves are, in all their singular varieties, perennial; and, from their succulent nature, they can live almost without water. The stems are jointed, and generally armed with bunches of sharp spines intermixed with bristles; they produce flowers on proper foot-stalks, or adhering to the stem; some of these flowers are of great beauty; and the fruit

* See Shaw's Travels, vol. i. p. 266.

by which they are followed is, in several of the species, edible.

The small melon-thistles are covered with tubercles or warts all over, and the flowers come out between them : while on the great melon-thistles, which are of an oval or globular form, the spines are arranged in rows along a kind of ribs. The torch-thistles rise to a greater height, in prismatic or cylindrical stalks, with projecting ribs ; and they are very much jointed and branched. The creeping cereuses are like the former, only the stems are much slenderer, and the joints much more flexible ; so that they cannot support themselves, but lie along the ground or climb up trees, in doing which they throw out roots from the stem, like ivy. The Indian figs have the portions or lobes of the stem flattened, like the sole of a shoe ; they are scattered over with spines ; and the flowers are produced from the extremities of the remotest branches. The *Phyllanthus*, has the lobes flattened so as to resemble leaves indented at the edges, and without any spines, the flowers appearing nearly in the indentations ; while the Barbadoes gooseberry (*Cactus pereskia*) has a round stalk, with leaves which are thick and flat, and come alternately from the stalk ; the spines are large and stiff, and appear chiefly at the junctions of the leaves with the stem, at which places, also, the flowers make their appearance. The flowers vary in form, some being pitcher-shaped, and some elongated, and many of them are of the most brilliant colours. The fruit varies from the size of a currant to the size and shape of a fig ; from which latter circumstance, and their being natives of the West Indies and the adjoining countries, they are called Indian figs. Throughout the West Indies, Mexico, and the other cultivated parts of tropical America, the larger species of the cactus are used for hedgerows, the strength of the stems, and formidable armature of the spines, rendering a hedge of them proof against animals.

The fruit of several of the species is eaten ; but those which are most esteemed are the *C. Opuntia*, or Indian fig ; the *C. triangularis*, or strawberry-pear ; and the

C. speciosissimus. The first is the prickly-pear, having fruit about the size of figs, and internally of a red colour; but varying in quality with the variety and the climate in which it is produced. The strawberry-pear belongs to the creeping class; the fruit is small, but it is the finest flavoured of any, and is much relished in some of the West Indian Islands. The *C. speciosissimus* has fruit twice as large as a large gooseberry, green, and exceedingly delicious.

The species denominated "cochinellifer" is generally understood to be that which feeds the cochineal insect; but probably that insect feeds upon various sorts of cactus and other succulent plants, though its efficiency and brilliance as a dye may vary with the plant.



Strawberry-Pear.

THE PAPAW (*Carica papaya*).—Though the papaw-tree is now found in the East as well as in the West, it is generally understood to be a native of America, and to have been carried to the East about the time of the



†papaw.

first intercourse between the two continents. The papaw rises with a hollow stem to the height of about twenty feet, after which it has a head composed, not of branches, but of leaves and very long foot-stalks. The male and female flowers are on different trees: the female flowers are bell-shaped, large, generally yellow, and followed by a fleshy fruit, about the size of a small melon. The tree, and even the fruit, are full of an acrid milky juice; but the fruit is eaten with sugar and pepper, like melon; and when the half-grown fruit is properly pickled, it is but little inferior to the pickled mango of the East Indies. There are many forms in the fruit, and some varieties in the colour of the flower of the papaw: and there is also a dwarf species; though, as this has been observed chiefly in arid situations, it may be the common sort stunted for want of moisture.



Passiflora-flower and fruit.

GRENADILLAS (*Passiflora*).—The passion-flowers are a very numerous genus; they are mostly natives of the West Indies and the tropical parts of America, from which some of the species have been introduced into this country, chiefly on account of the beauty of their flowers. Few of the species bear fruit in this country.

The grenadillas with which we are best acquainted are those of the West Indian Islands, the chief of which are the purple-fruited (*Passiflora edulis*)—the *Passiflora quadrangularis*—and the water-lemon (*Passiflora laurifolia*). The stem of the first is herbaceous, the fruit round, of a light purple, when ripe, with a whitish and rather pleasant pulp. The *Passiflora quadrangularis* is the most valuable for cultivation here; and it has borne fruit in the gardens of the Horticultural Society. The

water-lemon is a larger and more woody plant: the flowers are handsome, and very fragrant; and the fruit something in the shape and of the size of a lemon, full of a watery but very agreeable tasted juice, whence the name. The plant grows wild in the woods, but is often cultivated for the sake of its fruit. It was introduced into England about the same time with the pine-apple, but it has not met with equal attention.

On the American continent, and especially in Brazil, where the productions of the vegetable kingdom are very numerous and luxuriant, there are many varieties of grenadilla, if not distinct species, with which botanists do not appear to be very well acquainted; indeed, the forests and savannas of Brazil appear to offer the richest harvest for botanical research of any places now on the surface of the globe. Piso, in his 'Natural History of Brazil,' enumerates and gives figures of several sorts of grenadilla, under the name of *Murucuja*. One, he says, has five-lobed leaves and purple flowers, with oblong fruit, larger than any European pear, filled with a mucilaginous pulp, of a scent and flavour that nothing can exceed. Another has the same leaf and flavour, but fruit in the form and size of an apple, the pulp of which has a vinous flavour. There are many other sorts, but these are described as the best. The grenadillas generally, which are called *parchas* by the Spaniards, have a pleasant sweetish acid, with a fragrance something between that of a melon and a strawberry.

THE MANGO (*Mangifera indica*).—The mango, which grows abundantly in India, the south-eastern countries of Asia, Brazil, and some other places, is accounted one of the most delicious of the tropical fruits, and second only to the mangostan. The tree on which it is produced is large, with lance-shaped leaves, bearing some resemblance to the walnut. The flowers are small and whitish, formed into pyramidal bunches; the fruit has some resemblance to a short, thick cucumber, and on the average of the varieties, of which there are many, about the size of a goose's egg. At first the fruit is of a fine green colour, and in some of the varieties it continues so, while



The Mango (*Mangifera indica*).

others become partly or wholly orange. When ripe, the mango emits a smell, which, though faint, is very pleasant; and the flavour of it is then as delicious as can be imagined. Externally there is a thin skin; and upon removing that, a pulp, which has some appearance of consistency, but which melts in the mouth with a cooling sweetness, that can hardly be imagined by those who have not tasted that choicest of nature's delicacies. In the heart of the pulp there is a pretty large stone, resembling that of a peach, to which the pulp adheres firmly.

The mangos of Asia are said to be superior both in size and flavour to those of America; and so highly are some of the finer trees prized in India, that guards are placed over them during the fruit season. The mangos of Mazagong, which are thus carefully watched, are thought to be superior to any other. The varieties of a fruit so much esteemed must be numerous,—accordingly it is reckoned that there are upwards of forty in the

island of Java alone, while those of some of the islands farther to the east, such as Amboyna and Banda, are said to be still finer. The *Mango dodol* is the largest variety, the fruit weighing upwards of two pounds,—generally about the size of a middling shaddock. Some of the others, which make up the five principal heads into which Rumphius, in his ‘Herbarium Amboinense,’ arranges the whole, are of superior size and flavour; but the fruit, taken altogether, is one of the chief dainties of the vegetable world.

The mango is never brought from India to this country in any other state than the green fruit pickled, from which no idea of the flavour can be formed. The ripe fruit is very perishable; and when it begins to decay it is offensive, and tastes strongly like turpentine. It is not easy even to secure the vegetative power of the nut or kernel during the voyage from India, unless it be inclosed in wax; and the plants are with difficulty preserved as objects of curiosity.

In the Transactions of the Horticultural Society for 1826 there is an account of some mangos, raised by Earl Powis, at Walcot Hall, in Shropshire. “The mango,” says Mr. Sabine, the secretary to the society, in his very able paper upon the subject, “is well known to all travellers who have visited the tropical parts of the world, as being by far the best fruit that is generally produced in those regions, and as that which is the most uniformly grateful to a European palate. In such climates, it is cultivated wherever the arts of civilization have penetrated: and it may there be said to hold the same station, among other fruits, as the apple possesses among those of northern regions. Like the apple, the number of varieties raised from the seed of the mango is also very great; and of these, while some possess the highest excellence, there are others in which the flesh of the fruit is so fibrous and ill-flavoured, as to resemble, as is commonly said nothing so much as a mixture of ‘tow and turpentine.’”

The MANGOSTAN (*Garcinia mangostana*) — The Mangostan, or Mangustin, is one of the most delicious



Mangostan.

fruits that grows ; and the tree (*Garcinia mangostana*) on which it is produced is one of the most graceful and beautiful anywhere to be met with. It is a native of Sumatra, and also of the Molucca or Spice Islands, from which it has been transplanted in Java, and some other parts of the eastern Archipelago. The stem, which is of a variegated brownish-red colour, rises to the height of about twenty feet ; the branches come out in regular order, and give the head of the tree the form of a parabola ; and the leaves are entire, about eight inches long, and four broad at the middle, of a beautiful green on the upper side, and a fine olive on the under. The flower resembles that of a single rose, with some dark red petals. The fruit is round, about the size of an ordinary orange ; and has a little cap on the extremity, under which it is platted into rays. The shell of the fruit, which is at first green, but changes to brown marked with yellow spots, has some resemblance to that of a pomegranate, but is thicker and softer, and the contents are more juicy. The pulp is divided internally by thin septa, like those in an orange, and the seeds are lodged in the divisions. The flavour of the pulp is said to be that of the finest grape and strawberry united ; but those who have tasted the fruit in perfection, and attempted to convey to others some idea of the impression

that it had made on them, are not agreed as to what it resembles. Abel says that "he and his companions were anxious to carry with them some precise expression of its flavour; but after satisfying themselves that it partook of the compound nature of the pine-apple and the peach, they were obliged to confess that it had many other equally good but utterly inexpressible flavours."

There are two other species of this tree. These are the Celebes mangostan (*Garcinia celebica*), and the horny mangostan (*Garcinia cornea*). The first is found wild in the woods of Celebes, near Macassar, whence it has been transplanted to Amboyna, Java, and other places; but the fruit, which is rather larger than that of the true mangostan, does not always ripen. The corneous species is found in the high remote mountains of Amboyna: it is a lofty tree, though not of very great diameter. The fruit is so excellent as nearly to equal the true mangostan. The wood is very hard, heavy, and tough, and of the colour of horn, from which latter circumstance the specific name is given to it.

The DURIUM (*Durio zibethinus*).—The durion, which is pretty generally diffused over the south-east of Asia, is accounted next to the mangostan; and, in the opinion of some, is superior to it. However excellent the taste may be, the durion is revolting to those unaccustomed to it; for it has a strong smell, which is said to arise from sulphuretted hydrogen. Yet this quality is soon forgotten, after the palate becomes familiar with it. Though of the most nutritious quality, and the most dainty taste, the durion never palls upon the appetite or injures the digestion; its effects are directly opposite.

The tree which produces the durion is about the size and sometimes in the form of a pear-tree; but the leaves are in shape like those of the cherry, only they are entire and smooth at the edges. The flowers are large, and of a yellowish white. The fruit is large,—in some of the species as large as a man's head; and, externally, it is not unlike the bread-fruit. It has a hard rind covered with warts and tubercles. When ripe, it becomes of a brownish yellow, and opens at the top. It



Durion.

must then be eaten fresh from the tree, as it putrefies in less than twenty-four hours.

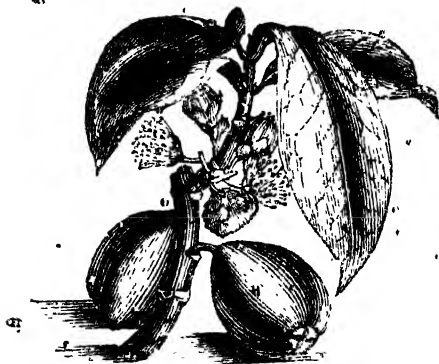
Internally, the fruit contains five large longitudinal cells, in each of which are the seeds, about the sizes of pigeons' eggs, and from one to four in each cell. The remainder of the cells is filled with the pulp, which is the delicious part of the fruit. It is of the consistence of thick cream, of a milk-white colour, highly nutritious, and blending the flavour and qualities of a delicate animal substance with the cool acidity of a vegetable. This compound flavour is peculiarly its own, and cannot be imitated by any process of cookery. The Spanish *Mangia blanco*, pullets' flesh distilled with vinegar, is said to come the nearest to it.

The durion is a particular favourite with the natives of the Eastern Archipelago; and there are many varieties of it. They all, however, belong to three principal ones:—The *Borneo* durion is found in the island after which it is named. It grows to so great a size, that one fruit is a load for a man. The *Cassomba*, which has a

smoother rind, is more orange in the colour, more elongated in the shape, and contains fewer seeds and more pulp. The *Babi* is a small, but very delicious sort. The kernels or seeds of the durion, when roasted, have nearly the same taste as chestnuts. It has not been found in a wild state, but in the countries where it will grow and ripen at all, it is easily cultivated. So highly is it esteemed, that it is the most costly fruit in the archipelago—a single durion being worth more than a dozen of the choicest pine-apples.

The *Lanseh* and the *Jahlee*, fruits of Sumatra, are esteemed most highly by the natives—the former next to the durion.

The **MALAY APPLE** (*Eugenia malaccensis*).—This, though an inferior fruit to the durion, is attractive by its fragrance—its smell being that of a rose. The Malay apple belongs to a numerous genus of plants, there being a great number of species very generally diffused over the tropical countries. The fruit of all the species is a fleshy rind, inclosing one or two large seeds. The Malay apple varies in size from about an inch in diameter to the bigness of a man's fist. The skin is yellowish,



"Malay Apple.

thin, and shining; the nut large, and without any hard shell; and the pulp very wholesome and agreeable. The tree that produces it has a brown stem, about twenty feet high, very full of branches at the top; the young leaves are bright purple, and the old ones green.

LOVE-APPLE (*Solanum lycopersicum*).—The love-apple, or tomato, is a native of the tropical parts of South America, and belongs to the family Solanææ; but as it now thrives well in the warmer countries of Europe, and will, if the plants are forwarded in a hotbed in the early part of the season, produce fruit with as much certainty in this country, upon a warm border, it may be considered as naturalized in the temperate regions. It is an annual; the leaves and flowers have some resemblance to those of the potato, only the latter are yellow. The fruit, when ripe, attains the size of a small apple. It is compressed at the crown and base, and furrowed along the sides; the whole is of uniform colour, and smooth and shining. There are some varieties both in the shape and colour of the fruit; bright red and orange are the prevailing colours. The love-apple is used for eating in every stage of its growth. When green it is pickled or preserved; when ripe, it is employed for soups and sauces, and the juice is made into a kind of ketchup.* In this country, however, where the culture requires a good deal of care, except in favourable situations, the love-apple is not in very general use; but in warmer countries it is in much more esteem, so that in Italy whole fields are covered with it, and it is a general article at table.

Humboldt describes a species of the *Solanum*, which he conceives indigenous to the isle of Cura, and which is at present cultivated in many parts of South America. The fruit is round and small, but very savoury.

The *Egg-plant* belongs to the same family, has the same habits, and requires nearly the same culture as the love apple. It is found in the warmer parts of Africa, Asia, and America: it is an annual; rises to the height of about two feet; bears light violet flowers, which are followed by large fleshy berries, having the size and

shape, and, in the white varieties, very much the colour and resemblance of eggs,—whence the common name. The forms of the egg-plant are globe-shaped and oval; and some of both forms are white and others purple or mottled. The egg-plant, according to the ‘*Hortus Kewensis*,’ has been cultivated in England since the year 1596; but it has seldom been made use of as an article of cookery. Even on the Continent, where the temperature agrees better with its habits, it has not so much flavour as the love-apple; but still it is used in soups and stews, and also eaten sliced and fried with oil or butter. Though the young plants require to be forwarded in a hotbed, they may afterwards be made to produce fruit on warm and sheltered borders; and both they and the love-apple succeed best when placed against a sunny wall.

Besides the white egg-plant (*Solanum melongena*, Linnæus), which has been long cultivated as a curiosity, though never used as food; there are several others; and M. Dunal, in his History of Solanums, has separated the edible ones, of which he has enumerated four varieties, into the species of *Solanum esculentum*. The round and the long variety of the esculent are both cultivated in the garden of the Horticultural Society. The plants, which are annuals, are raised to the height of nine or ten inches in the stove, and then planted on the borders in the open air, where they grow to the height of between two and three feet. The fruits of both are large: the round, or rather oval (for that is its proper shape), is four inches long, and about three thick. This variety is called the Mammoth egg-plant. The long has larger fruit, measuring sometimes as much as eight inches in length. They vary much more in colour than the round,—some of them being streaked with yellow. Other varieties are described as being found in India; but the seeds that have been sent to this country have produced fruit similar to the kinds now mentioned.

Various species of the solanum are common in the Levant: and three are particularly described by Dr.

Walsh in the Horticultural Transactions. The following is the substance of his communication :—

Solanum Æthiopicum is the scarlet egg-plant, of which the fruit is produced in the neighbourhood of Constantinople ; but it is rare, being never sold in the markets, and but seldom seen in private gardens. It is used as an ingredient in soups.

Solanum Sodomeum is a purple egg-plant, of which the fruit is large and handsome. A species of *cynips* often attacks and punctures the rind ; upon which the whole fruit gangrenes, and is converted into a substance like ashes, while the outside is fair and beautiful. It is found on the borders of the Dead Sea, and is that apple the external beauty and the internal deception of which have been so celebrated in fabulous and so perplexing in true history.

“ Dead-Sea fruits, that tempt the eye,
But turn to ashes on the lips.”

The dreadful judgment of the cities of the plain, recorded in sacred history,—the desolation around the Dead Sea,—the extreme saltness of its waters, the bitumen, and, as is reported, the smoke that sometimes issued from its surface,—were all calculated for making it a fit locality for superstitious terrors ; and among the rest were the celebrated apples which are mentioned by Josephus, the historian of the Jews, not as fabulous matters of which he had been told, but as real substances which he had seen with his own eyes. He says, they “ have a fair colour, as if they were fit to be eaten ; but if you pluck them with your hand, they vanish into smoke and ashes.”

Milton, who collected all of history or fable that could heighten the effect of his poem, refers to those apples as adding new anguish to the fallen angels after they had been transformed into serpents, upon Satan’s return from the temptation of man.

‘ There stood

A grove hard by,

_____ laden with fair fruit, like that
 Which grew in Paradise, the bait of Eve,
 Used by the Tempter : on that prospect strange
 " Their earnest eyes they fix'd, imagining,
 For one forbidden tree, a multitude."

" They, parched with scalding thirst, and hunger fierce,
 _____ could not abstain ;
 But on they rolled in heaps, and up the trees
 Climbing, sat thicker than the snaky locks
 That curl'd Megæra : Greedily they pluck'd
 The fruitage fair to sight, like that which grew
 Near that bituminous lake where Sodom placed ;
 This more exclusive, not the touch but taste
 Deceives ; they fondly thinking to allay
 Their thirst with gust, instead of fruit
 Chew'd bitter ashes, which the offended taste
 With sputtering noise rejected."

Henry Teonge, a chaplain in the English fleet, whose Diary was, a few years since, published from the original manuscript, so well describes the real condition of the decayed *Solanum Sodomæum*, which he states that he saw in December, 1675, that no one can doubt that his notice was founded upon personal examination. " This country (that about the Dead Sea) is altogether unfruitful," says he, " being all over full of stones, which look just like burnt syndurs. And on some *low shrubbs* there grow *small round things*, which are called apples, *but no witt like them*. They are somewhat fuyre to looke at, but touch them and they moulder all to black ashes, like soote, boath for looks and smell." Though these are only the remarks of a popular observer, who told what he saw, without any view to a scientific purpose, the single addition of the attack of the plant by the insect, and the subsequent mortification and internal drying, would have made it just as perfect as the descriptions of the present day.

Pococke, who travelled more than fifty years after Teonge, did not see the apples ; and though he did mention them, he pointed to a plant very different from the real one : " As for the fruits of Sodom, fair without

and full of ashes within," says he, "*I saw nothing of them*: but from the testimony we have, something of the kind has been produced; but I imagine they may be pomegranates, which, having a tough, hard rind, and being left on the trees for two or three years, the inside may be dried to dust and the outside remain firm." Mariti, who visited those regions thirty years after Pococke, mentions that "No person could point out to me in the neighbourhood that species of fruit called the apples of Sodom, which, being fresh and of a beautiful colour in appearance, fall to dust as soon as they are touched." Hasselquist, however, not only found the apples, but the plant, referred it to the Linnæan species of *Solanum melongena*, and pointed out the cause of the disease; and though, in the more recent and accurate division of the genus *Solanum*, to which allusion has been made, the name of *Sodomæum* has been substituted for that of *melongena*, the fruit and the disease have been proved to be as Hasselquist stated.

Solanum melongena is more common in the markets of Constantinople than either of the former sorts, being almost as abundant as the gourd and the melon, and used for nearly the same purposes. There are several varieties of this solanum. The first appearance of the plant it is said, is always attended with a north-east wind of some continuance; and therefore the ships for the Black Sea sail before this harbinger, or rather companion, of bad weather comes forth. This is probably one of the superstitions which in all countries attach to matters so uncertain as the weather.

The following fruits belong to the natural order Cucurbitaceæ, and are remarkable for the large quantity of water contained in their tissues. Some of the Cucurbitaceæ, as the *Elæterium* and *Colocynth*, secrete in their fruits an acrid principle which is more or less developed in those which are ordinarily taken as food. The melons and cucumber are generally uncooked, and are regarded in this country as indigestible. This appears to result more from climate than the fruits themselves, as in countries where from the heat of the atmosphere a large

demand is made by the system for fluid to supply the constant loss going on from the skin, these fruits, containing large quantities of water, are easily digested. But where the demand for fluid is small, as in northern climates, these fruits are indigestible.

THE MELON (*Cucumis melo*).—The melon is the richest and most highly flavoured of all the fleshy fruits. It is often said to be a native of the central parts of Asia, and to have been first brought into Europe from Persia; but the date of its first culture is so remote, that there is no certain knowledge on the subject. Pliny and Columella describe the fondness of the Emperor Tiberius for melons, and detail the contrivances by which they were procured for him at all seasons. Stoves appear to have been used in this process; so that forcing-houses were not unknown to the Romans. The melon has certainly been generally cultivated in England since about the middle of the sixteenth century; how much earlier is not known. It is highly probable that those ecclesiastics who paid such attention to the other fruits grown in Italy and France, would not neglect one so delicious as the melon; and it is distinctly said by a writer on British Topography, Gough, that the cultivation of the melon in England preceded the wars of York and Lancaster, but that it was destroyed in the times of civil trouble that succeeded. It is probable, however, that the melon was confounded with the pumpkin by the earlier writers whom Gough consulted. While in France, and in England, melons are grown as an article of luxury, in some parts of the East they are used as a chief necessary of life. Niebuhr, the celebrated traveller, says, "Of pumpkins and melons, several sorts grow naturally in the woods, and serve for feeding camels; but the proper melons are planted in the fields, where a great variety of them is to be found, and in such abundance, that the Arabians of all ranks use them, for some part of the year, as their principal article of food. They afford a very agreeable liquor. When its fruit is nearly ripe, a hole is pierced into the pulp; this hole is then stopped with wax, and the melon left upon the stalk. Within a few days the



Gourds.

pulp is, in consequence of this process, converted into a delicious liquor." Mr. Soahey has alluded to this circumstance in the following passage :

Whither is gone the boy ?
 He had pierced the melon's pulp,
 And clothed with wax the wound ;
 And he had duly gone at morn
 And watched its ripening rind ;
 And now all joyfully he brings
 'The treasure, now matured.' *

Although the melon is a very delicious fruit, it is not one of the most wholesome ; more especially in cold climates, where, if eaten in any considerable quantity, it is apt to derange the stomach, unless corrected by warm and stimulating ingredients ; and the same remark may be applied to the cucumber.

Small melons are, when equally ripe, more highly flavoured than large ones. In general, however, the fruit is chosen as much for show as for use, and thus the large ones are preferred. Indeed, in almost all the cultivated fruits and vegetables, quality is very apt to be sacrificed

* Thalaba, book ii.

to appearance ; as in the markets the articles are bought by the judgment of the eye, and not by that of the palate. To obtain the large size, a ranker manuring, and higher culture, must be resorted to than are altogether consistent with the natural development of the juices of the plant.

Of the melon there are many varieties, and the number of them is constantly increasing. The Cantaloupe is one of the best. It obtains its name from a seat belonging to the Pope, not far from Rome, where it was probably first cultivated in Europe, and whence it has spread into most countries. The Cantaloupe is of a middling size, nearly round in form, and remarkably rough and irregular in the surface. The colours, both of the surface and the flesh, vary,—the former from orange mottled with green, to green mottled with black ; and the latter from white, or nearly so, to orange tinged with rose colour. The flesh of some varieties is greenish, but these are inferior to the others. When melons of this sort are equally ripened, it may be considered as a general rule, that those which are darkest on the outside, most richly tinted in the flesh, and of a moderate size, have the most high and musky flavour.*

There is also a small African or Egyptian melon, the flesh of which is green, of particular excellence. Frederick the Great was passionately fond of these melons ; and Zimmerman, who attended him in his last illness, finding him very ill from indigestion, discovered that he ate three or four of them daily for breakfast. On remonstrating with the king, the only answer that the physician could get, was, that the king would send him some of the fruit to taste the next day,—as if its excellence would be a sufficient apology for the habitual indiscretion.*

The Romana is also a fine melon ; and it ripens earlier than the Cantaloupe. The surface is often netted. It is of an oval shape, highly flavoured, and, when good, very heavy and solid.

* Zimmerman's Conversations with the King of Prussia.

The Salonica, which has been but recently introduced into this country, is a beautiful melon. It is spherical, smooth, and of a fine golden colour. The flesh is white, very sweet, and in consistency resembling the water-melon. The Salonica preserves its qualities though it is very large; and with good culture specimens may be had weighing seven or eight pounds.

The small Portugal is a very early and productive melon, but not remarkable for flavour. The rock-melons are thickly set with knobs; they are of various colours, and some of them of very fine flavour. The oblong ribbed is marked into segments from the root to the crown; it is very productive; and the flavour is so high, that it is sometimes called, by way of eminence, the musk-melon.

The melons of Persia have long borne a high character. "Persia," says Malte-Brun, writing after Chardin, Olivier, and Langles, "is consoled for the occasional failure of her grain crop, by the fineness of her fruits. There are twenty sorts of melons—the finest in Khorassan. In Persia this fruit is extremely succulent, and contributes greatly to health: they are sometimes so large that three or four are a full load for a man." It was not till lately that the seeds of melons were received here direct from that country. In 1824, Mr. Willock, the Ambassador to the Court of Persia, sent a parcel of seed; and another parcel in the spring of 1826. An account of ten varieties of these melons, by Mr. Lindley, was read before the Horticultural Society in September, 1826; and the individual fruits referred to were the produce of the Society's garden that season.

The Persian melons are extremely rich and sweet; and instead of the thick rind of the common melons, they have a very thin and delicate skin, which makes a fruit of the same apparent size contain nearly twice as much edible matter. In addition to this, the melons are beautiful, and they bear abundantly; but they require a great deal of care. In the warm climate of Persia, the only attention which they ask from the cultivator, is to be regularly watered; and though the melons may be sup-

plied with water artificially, the air, in their native country, is still very dry: this humid soil and dry atmosphere are, as Mr. Lindley remarks, very difficult to be obtained in this country. The covering which is requisite for confining the heat confines also the moisture raised by evaporation. It is further judiciously observed in this paper, that the supply of water should be at the roots, and not over the plant; and that the air should be kept warm by repeated changes of soil on the surface, and dry by abundant ventilation. Some of the melons, of which Mr. Willock furnished the seed, are ready for the table as soon as cut; and some are winter-melons, which must be kept for some months before they are eaten.

THE CUCUMBER (*Cucumis sativa*).—The cucumber, like the melon, is an annual, and, being a native of warmer climates, it does not ripen in Britain, except in very favourable situations, without the protection either of a frame or a hand-glass.

In the East the cucumber has been very extensively cultivated from the earliest periods, as well as most of the other species of gourd. When the Israelites complained to Moses in the wilderness, comparing their old Egyptian luxuries with the manna upon which they were fed, they exclaimed, "We remember the fish which we did eat in Egypt freely,—the cucumbers and the melons." Hasselquist, in his Travels, states that these cooling fruits still form a great part of the food of the lower class of the people in Egypt, especially during the summer months; and that the water-melon in particular, which is cultivated in the alluvial soil left by the inundation of the Nile, serves them for meat, drink, and physic. The cucumber of Syria was cultivated in large open fields, in which a hut was erected for the abode of the watchman, who guarded the fruit against foxes and jackals. These fields, doubtless, were far away from the habitations of men; for Isaiah, speaking of the desolation of Judah, says, "The daughter of Zion is left as a cottage in a vineyard—as a lodge in a garden of cucumbers." In India beyond the Ganges, Bishop Heber saw a man in a

small shed of bamboos and thatch, watching a field of cucumbers; and he was naturally interested in the circumstance, as being the same custom to which Isaiah alludes. He again observed a watcher of cucumbers, who lighted a fire during the night, to keep off the wild dogs and wolves from his fruit. On the west side of the Jordan, Burckhardt saw fields of cucumbers.

The cucumber has been known in England from the very earliest records of horticulture. Gough says, that it was common, like the melon, in the time of Edward III.; but being neglected and disused, became entirely forgotten till the reign of Henry VIII. It was not generally cultivated till about the middle of the seventeenth century. There are many varieties of cucumbers.

Some cucumbers are cultivated for their fantastic shapes, of which the *Snake* is remarkable for its great length and small diameter; but it is of no value except for show.

GOURDS (*Cucurbita*).—Of the gourd there are many varieties, some of them of beautiful form and colour, and others of an immense size. In England, however, they are cultivated more as matters of curiosity than for food. One sort, the Pumpkin (*Cucurbita pepo*), is occasionally eaten, but always in a baked state, and combined with other substances of higher flavour. In warm situations, and when highly manured, it grows luxuriantly in the open air; and villagers sometimes grow it, and, when ripe, convert it into a sort of pie, by cutting a hole in the side, extracting the seeds and filaments, stuffing the cavity with apples and spices, and baking the whole. The pumpkin seems to have been earlier introduced into general culture than either the cucumber or the melon: the pumpkin is, in fact, the melon of the old English writers, the true melon being then styled the musk-melon. The pumpkin or gourd enters more into the cookery of the southern nations on the Continent, than into those of Britain.

The Squash (*Cucurbita melopepo*) is little cultivated or eaten in this country, though it is often used in the southern parts of Europe and in North America. It is

said to be a native of the Levant, but probably it is found in many other places. It is better adapted for boiling or stewing, in a green state, than any other gourd. At Versailles the people esteem it so much for this purpose, that they call it a "*livre d'huile*." The orange-fruited gourd (*Cucurbita aurantia*) is a native of the East Indies. It is a very handsome variety, but cultivated only as a curiosity. The calabash, or bottle-gourd (*Cucurbita lagenaria*), is similar to the other in quality, and gets its trivial name* as well from its forms, as from the use to which the hard and tough rind is applied. It is a native both of the East and West Indies; and the humbler inhabitants employ these gourds as ready-made bowls and other vessels. In some parts of the East gourds are sufficiently large to support a man in the water, who floats upon a cross-bar fastened to the top of two of vast dimensions.

Vegetable Marrow (*Cucurbita succadu*) is a very important gourd; and though it has been but lately introduced into this country, it is already cultivated to a considerable extent. It is straw coloured, of an oval or elongated shape, and when full grown attains the length of about nine inches. When very young, it eats well fried in butter; when half-grown, it may be cooked in a variety of ways, and is peculiarly soft and rich, having an oily and almost an animal flavour; when fully matured, it may be made into pies, for which purpose it is much superior to any of the other gourds. But it is in the intermediate or half-grown state only, that it deserves its common appellation of vegetable marrow. The vegetable marrow gourd is a native of Persia; but if the soil on which it is placed be rich and warm enough, it thrives very well with us in the open air.

"I have been able," says Mr. Sabine, "to obtain but very imperfect accounts of the origin of this gourd. It was certainly new in this country within a few years; and I

* *Trivial* is a term used by botanists for a name descriptive of the species only—as distinguished from other names which point out a genus.

think the most probable account, of the many that I have heard, of its introduction, is, that the first seeds were brought here in one of our East India ships, and came probably from Persia, where, as I am told, it is known, and called Cicader. Its cultivation is easy." If any other kind of gourd grow in the neighbourhood, no reliance can be placed on the goodness of the seed of the vegetable marrow.

The Water-melon (*Cucurbita Citrullus*), though not much cultivated in this country, is one of the most valuable vegetables in warm and arid climates, answering there both for food and drink. The fruit is large, the flesh sweet and succulent, and the juice delightfully cool. Hasselquist, however, recommends caution in the use of this gourd, "for," says he, "it chilled my stomach like a bit of ice."* It is a native of the south of Europe, of Egypt and the Levant, and of South America. In the peninsula of Araya, where sometimes rain does not fall for fifteen months, water-melons weighing from fifty to seventy pounds are not uncommon.† It was introduced into England about the same time with the common melon.

* Travels in the Levant, p. 257, 8vo.

† Humboldt, Voyages, liv. iii., chap. viii.

CHAPTER XXV.

OXALIC ACID, RHUBARB, AND SORREL.

OXALIC acid, although a poison when taken pure in large quantities, is found combined with potassa in many plants, in the form of a super-salt, and gives to them a pleasant acidity. In this state it may be used with impunity. One of these plants is the Rhubarb (*Rheum*), which belongs to the natural order Polygonaceæ.

The petioles of the rhubarb contain the largest quantity of acid; these, when peeled and cut into pieces, form no unworthy substitute for fruit in spring tarts; to furnish a supply for which this plant is now largely cultivated in the vicinity of the metropolis.

Several species of *Rheum* are cultivated in England. The root of the true Rhubarb (*Rheum palmatum*) is well known as a medicinal drug, and for that purpose has long been imported from the Levant, though the particular plant of which it was the root was not ascertained until 1758, when it was first introduced and cultivated in this country by Dr. John Hope.* It is a native of some parts of Tartary, where the physical characters of the climate are well adapted for the perfecting of its root, the properties of which are very faintly retained in countries where the season of dormant vegetation is humid. This plant is of very handsome appearance. Its beautiful palmate leaves distinguish it from the other species; but as the parts used for culinary purposes, the footstalks of the radical leaves, are much smaller than those of the other kinds, it is not in general cultivation.

MONK RHUBARB (*Rheum rlaponticum*) is also a native

* Phil. Trans., vol lv.



Rhubarb (*Rheum almatum*).

of Asia, but of what particular part is not known, neither is the time of its introduction ascertained; we find it mentioned by Tusser so early as 1573, as being then cultivated in England.

The leaves of this species are blunt and smooth, with red veins; the footstalks have also a red tinge, they have a groove or furrow on their upper sides, and are rounded at the edges.

The HYBRID RHUBARB (*Rheum hybridum*) is a native of more northern parts of Asia than the others, and is of more recent introduction into Britain. It was first cultivated in this country by Dr. Fothergill in 1778, but it did not come into general use as a culinary vegetable till several years after, having been introduced in our kitchen-gardens for this purpose about thirty years back. This plant is of a much more lively green than the former species. The leaves are slightly heart-shaped and very large, being, in favourable soils and under good culture, sometimes as much as four feet in length, including the footstalk. In the 'Gardener's Magazine' for February, 1829, we find a notice of a plant of this species, 'the leaves of which attained to great dimensions. One leaf being cut, with its petiole, was found to weigh four pounds. The circumference of the leaf, not including its footstalk, measured twenty-one feet three inches; its diameter, three feet ten inches; length of leaf, including the petiole, five feet two inches; and length of petiole, one foot four inches. The stalks of the hybrid are much more succulent, as well as larger, than those of the Monk Rhubarb, which, therefore, cause it to be the preferable species for cultivation, although *Rheum undulatum*, called by gardeners Black Rhubarb, and the Elford Rhubarb, has been found the finest in flavour.

Rhubarb is very easily cultivated, and though it occupies much space, the produce, under proper treatment, is very considerable. The petioles obtained from it will furnish a greater supply of material for parts than the fruit of either apple or gooseberry trees occupying an equal breadth of ground. It may, therefore, be considered as a good plant for the cottage-garden, more espe-

cially as it comes into productive bearing in the earliest spring, a time when fresh fruit cannot be obtained.

Now plantations may be raised either by sowing the seeds or parting the roots. The latter is not, however, an eligible mode of culture. As in most cultivated plants, the produce of a sucker is, when it has to make its own root, always inferior in vegetative power to that which is originally from the seed—and vigorous vegetation is the quality most sought for in rhubarb—the flowering stems should be removed, except in such plants as may be wanted for seed. If the seeds are sown in spring, the plants will be ready for planting out in autumn, and will come up strong enough for use the next spring, after which the plantation will last for many years. The plants of the hybrid kind require from two feet and a half to three feet of space for each, and those of the other species about a foot less: but the superior produce of the former, under favourable circumstances, will more than compensate for the greater breadth required.

The common Wood-Sorrel (*Oxalis acetosella*) contains in its leaves super-oxalate of potassa, and it was from this plant that the acid which it contains was called oxalic acid. This plant is also known by the names of wood-sorrel, trefal, stubwort, allélujah, cuckoo's-meat, and *sorrel de bois*.

The whole plant has a grateful acid taste, more grateful than the common sorrel, and therefore more fit to be used in salads. It is not, however, much used for this purpose in this country at the present day. Before the discovery of the nature of oxalic acid by Scheele, chemists were in the habit of separating the super-oxalate of potash from this plant, and it was sold in the shops under the names of salts of lemon and salts of sorrel. It was used for taking spots out of linen, and other purposes for which oxalic acid is used at the present day. The wood-sorrel was at one time used in medicine, and found a place in our Pharmacopœias; but it is only used popularly at the present day. The genus *Oxalis* contains ap-

wards of two hundred and twenty species, most of which also possess oxalic acid.

The common sorrel (*Rumex acetosa*) belonging to the same natural order of plants as the rhubarb, also contains oxalic acid in union with potassa. On this account it is frequently employed as a salad. It has also been employed, as well as the wood-sorrel, for the purpose of procuring the super-oxalate of potash, which is sold under the name of salts of sorrel.

CHAPTER XXVI.

VOLATILE OILS—ALLIACEOUS PLANTS. 7

VOLATILE oils are distinguished from fixed oils by the readiness with which they are vaporised under the influence of heat. It is to these oils, or compounds closely resembling them, that the vegetable kingdom is indebted for its various scents and perfumes. The action of volatile oils also on the system is very different from that of the fixed oils. Whilst the latter enter directly into the system, through the medium of digestion, and may be taken in large quantities, the former act immediately on the nervous system, and would be destructive of life if taken in large doses. The effect of the volatile oils upon the nervous system is stimulant; and it is for this purpose that they seem to be coveted by man and lower animals as a part of their food. Through the medium of the nervous system they are indirectly excitants of the circulation and the secretions, so that according to their various peculiarities are they adapted to the peculiar wants of the system. Some are general stimulants; others act upon the mouth, fauces, and salivary glands; others on the stomach, liver, and bowels; others again on the kidneys, and so on. They may be divided into several classes, according as they come from one part of the vegetable kingdom or another, or as they are used in food.

First group, *Alliaceous Plants*.—These plants consist of bulbs, belonging to the natural order *Asphodelæ*, so called from the asphodel, which, though not a native of Britain, is cultivated as an ornament to our gardens.

A bulb differs from a root in being an underground

bud, which defends the embryo or future shoot from external injuries during the winter; and which is always made up of parts which are ultimately to be developed in the atmosphere. Whatever may be their form and structure, or whether they grow in the earth or above the surface, they are, in reality, stalks or leaves, generally the latter.

Bulbs are not very nourishing; yet though most of those under present notice have an odour that is far from agreeable, their pungency and supposed sanative qualities render them general favourites, especially among the humbler classes. The rustic inhabitant of the northern parts of Britain looks upon the onion as his chief vegetable dainty; and on some parts of the Continent, the garlic, which is rather too strong in flavour for the people of this country, is as much esteemed, being eaten by the poor as almost the sole addition to their black bread, and entering into many of the made dishes of the rich.

The ONION (*Allium Cepa*).—The use of the onion has been so long known in this country, that whence and at what period it was obtained cannot now be ascertained. It is not supposed that any variety of it is indigenous, since the large and mild roots which are imported from warmer climates deteriorate both in size and sweetness after having been cultivated a few years in this climate. The onion called the Stralsburg, and the varieties which have been obtained from it in this country, appear to be the most naturalized, as they are the hardiest which are grown. It is, therefore, probable that this plant was first introduced into England from the central parts of continental Europe; although it may have been originally the native of countries farther to the south, and have been rendered hardier and less prone to degenerate from its gradual change of climate.

The onions of Spain and Portugal, and even those of the south of France, are very superior to the common onion of our gardens, being of a much larger size, and more mild and succulent. These sorts, however, will not bear the colder climate of this country without dege-

nerating, while their seed seldom comes to maturity in Britain.

Though the history of the onion can be but imperfectly traced in Europe, there is no doubt as to its great antiquity in Africa, since there is evidence to show that this bulb was known and much esteemed in Egypt 2000 years before Christ. It still forms a favourite addition to the food of the Egyptians. Hasselquist, in a panegyric on the exquisite flavour of the Egyptian onion, remarks, that it is no wonder the Israelites, after they had quitted their place of bondage, should have regretted the loss of this delicacy; for whoever has tasted of the onions of Egypt must acknowledge that none can be better in any part of the universe. "There," says he, "they are mild and pleasant to the palate; in other countries they are strong and nauseous. There they are soft and yielding, but in countries to the north they are hard, and their coats so compact as to render them less easy of digestion." The Egyptians divide them into four parts, and eat them roasted together with pieces of meat; which preparation they consider so delicious, that they devoutly wish it may form one of the viands of Paradise. A soup made of these onions was pronounced by the learned traveller to be certainly one of the best dishes of which he ever partook.

This predilection for the savoury bulb extends in Africa beyond the country of the Nile. Major Denham, in his route south from Bornou, observed numerous gardens, but the only vegetable produced in them appeared to be onions.

This plant is a biennial, having long tubulated leaves, a swelling, pithy stalk, thicker in the middle than at either of the ends, and a large spherical head of flowers, which expand the second summer after sowing. The bulb, tunicated or formed of concentric coats; this varies in size materially, according to the variety, soil, and mode of cultivation. It seems to be a general law among this species of roots, that the small are more pungent than the large,—that those which have a tinge of red or purple are more pungent than those which are

white,—and that those which have the rind or outer membranous tunic upon the bulb thin and transparent are always of milder flavour than those which have it thick. It would be unprofitable as well as uninteresting to attempt an enumeration of the varieties of onions; and, even though it should be made complete at the present time, new varieties are so constantly springing up, that it would not long remain a correct list. Nearly twenty different kinds are recommended as being worthy of garden culture.

A rich mellow ground, on a dry subsoil, is the most favourable to the growth of this plant. It is propagated by seed sown broad-cast in spring; the quantity of seed being regulated according to the destination of the onions, whether they are to be drawn young or to remain for bulbing. The plants begin to bulb in June, increasing in growth till the middle of August, when the necks shrink and the leaves decay: they are then in a fit state to be drawn, and preserved for the winter store.

A method of improving the size of onions by transplanting them was recommended by Worlidge, so early as the beginning of the seventeenth century, in his '*Systema Horticulturæ*;' and this practice has lately been revived with great success by some eminent horticulturists.

The theory on which it is founded is extremely ingenious. Every plant which lives longer than one year, generates the sap or vegetable blood which will elaborate the leaves and roots of the succeeding spring. In bulbous plants this reserved sap is deposited in the bulb, which, in a great measure, it composes. Now the store which is thus formed varies considerably in the same species of plant, according to the particular circumstances under which it is raised. Thus the onion in the south of Europe accumulates a much greater quantity in a single season, under a greater degree, and longer duration of heat, than is afforded by our colder climates, and therefore it acquires, in a given time, a much larger size. Mr. Knight was induced by these observations to suppose that two short and variable summers in England

might, perhaps, be equal in effect to one long and bright season in Portugal; and, accordingly, he attempted a method of culture which has proved his inference to be correct. In pursuance of this plan seeds of the Portugal onion were sown in spring very thickly, on a poor soil, and in a shady situation. Under these circumstances, the bulb in the autumn had attained scarcely beyond the size of a large pea. The bulbs were then taken from the ground and preserved during the winter; in the ensuing spring they were again planted at equal distances: from this treatment the plants afforded bulbs very superior to those raised immediately from seed, some exceeding five inches in diameter; and being more matured, they may be preserved sound throughout the winter with greater certainty than those which are raised from seed in a single season.* Many other cultivators pursue, with some slight alterations, the same method, and find it perfectly successful.

It is found that in those countries in which the onion comes to the greatest perfection, the practice of transplanting it prevails.

In Portugal it is sown in November and December on a moderate hotbed, and protected from the frost, in which situation the plants remain till April or May, when they are transplanted to a rich soil.†

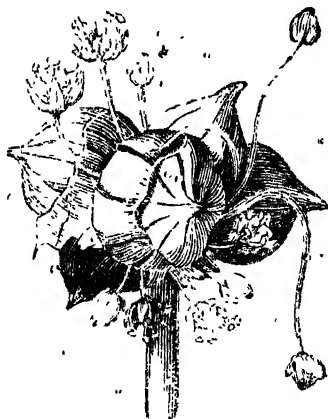
Onions are considered wholesome under any form; but they become more succulent and mild after having undergone culinary preparation.

The WELSH ONION, or CIBOULE (*Allium fistulosum*), is originally from Siberia. It is a hardy plant, and strong in flavour, approaching more nearly to garlic than onion. This species does not form a bulb. The cultivation of the ciboule has been known in England since the early part of the seventeenth century; how much earlier, there are now no means of knowing. It is much less cultivated in the present day than it was in former times, when broths and pottages, seasoned with the green tops of the onion tube, were more in fashion. It

* Hort. Trans., vol. iv.

† Ibid., vol. iii.

is now only occasionally raised for a spring crop. For this purpose the seed is sown at the end of July or August; in a fortnight the plants usually appear above ground; but in October their leaves wither, and the ground appears quite bare. In the beginning of the ensuing year, however, they become renovated, and in March are fit for drawing to be used as onions. The *SCALIEN* is another name given to long-necked onions, which produce leaves abundantly, but do not bulb.



Tree-Onion (*Allium proliferum*).

The **TREE OR BULB-BEARING ONION** (*Allium Cepa*, var. *viviparum*) is a singular variety, which has probably been produced by climate. It runs with a strong stem, about two feet in height, on the top of which the flowers are produced in a manner similar to the rest of the species; but instead of being succeeded by capsules containing seeds, the germs swell, and towards the end of the season a crop of bulbs is obtained from the top of the stalk, and which, in a natural state, as soon as they

drop off and fall to the ground, begin to put out roots and vegetate. This variety is more an object of curiosity than of use, though we learn that in some parts of Wales these bulbs are planted, and produce ground-onions of a considerable size, while the stem supplies a succession of bulbs for the next year's planting.

This variety is said to have been introduced here from Canada; the French call it *Pignon d'Egypte*; there is no proof, however, of its being a native of the country which its name would indicate, while the probability is greatly to the contrary. It is not in such a climate, but in cold and wet countries, that seminal plants are changed to viviparous. The same species of grass which has perfect seeds upon warm and dry grounds, bears little plants in the spike when grown upon the cold and humid mountain top; and the corn, which in a dry season remains firm and without any signs of vegetation in the grain, sprouts in the ear, and becomes green and matted in the shock, when the weather is rainy; this effect being produced much more frequently in the northern parts of the country than in the south. It is by no means improbable that in the humid atmosphere of the Hebrides both grain and pulse would become viviparous, if they were not taken to the barn and dried by artificial means. By analogy drawn from facts it is therefore probable that the tree-onion is not only from Canada, but that it is not indigenous there, being merely the common onion introduced from France by the colonists, and changed to the viviparous form by the climate.

The GROUND or POTATO ONION is another curious variety. This multiplies itself in an opposite direction to that of the tree-onion, producing, by the formation of young bulbs on the parent root, an ample crop below the surface. This plant has also been described as being a native of Egypt, or at least as having been brought from that country by the British army in the early part of the present century. It must be admitted that a plant which bears an additional number of bulbs is more likely

to be a native of a dry and warm climate than a plant which is viviparous. The time of the introduction of the potato-onion has, however, been erroneously assigned, since it was known and cultivated in the south and west of England some years prior to the Egyptian expedition. If it be a native of Egypt, or of any other warm country, it is, indeed, a hardy one, since it bears the alteration of the seasons, and resists the attacks of insects much better, it is said, than the common onion.

The bulbs are planted in the middle of winter; as the tops appear they are usually earthed up like potatoes, and by the middle of summer the new crop is ready for removing. The size and number of the new bulbs depend very much on the size of those which have been planted, but they always yield a proportionately large produce.

The CHIVE (*Allium schanoprasum*) is the smallest, though one of the finest flavoured of the genus. It is a hardy perennial plant, an inhabitant of Siberia, and said to be a native of Britain, though rarely found growing in an uncultivated state. The bulbs are very small, connected in clusters of an elongated form, and the leaves are long, slender, and pointed. The flowering stem, when it is allowed to rise, is slightly curved and seldom attains to more than a few inches in height: the flowers are white, with a purple tinge; they grow crowded together, and are, even in the most cold and moist situations, followed by capsules and seeds. When cultivated, the plants are, however, seldom allowed to run to seed, as they are not usually drawn to be eaten entire, but have the leaves and young tops cut off to be used as a potherb. Chives are very hardy, and require no attention during their growth except to keep them free from weeds; they are propagated by slips, or by dividing the roots in the spring or autumn.

When the leaves are gathered for use, if they are cut close, others will shoot up in succession, and in this manner a bed lasts three or four years; after which period it must be renewed. When fresh cut, these leaves are by some persons considered as an improvement to

salads and seasonings. Their flavour suffers greatly if they be kept after gathering even for a very short time, and their produce is but small in proportion to the labour of gathering. On these accounts they are not much cultivated in places where vegetables are supplied in the markets; and they seldom find a place in the garden of the English peasant, who, partly from ignorance, and partly from prejudice, does not live much upon those soups and savoury dishes which, while they are more wholesome and nourishing, than the food which he consumes, are also considerably cheaper.

The LEEK (*Allium porrum*) is said to be indigenous to Switzerland, whence it was introduced into this country; but it has been for so many ages under cultivation, that its native place cannot, perhaps, be very accurately traced. According to translators and commentators, this, as well as the onion and garlic, was included among the Egyptian luxuries after which the Israelites pined. It still makes its constant appearance at the tables of the Egyptians, who eat it chopped small as a savoury accompaniment to meat.

The exact period when the leek was first brought into this country is not known, but it is mentioned by Tusser, in his 'Five Hundred Points of Good Husbandry,' as early as 1562. There is, however, every reason for believing that it was introduced prior to that time, and had long been the favourite badge of the Welsh principality. Shakspeare makes this to have arisen at the time of the battle of Cressy. In the play of Henry V., Fluellin, addressing the King, observes:—

"Your grandfather of famous memory, an't please your Majesty, and your great uncle Edward the Plack Prince of Wales, as I have read in the chronicles, fought a most prave battie here in France.

"*King Henry.* They did, Fluellin.

"*Fluellin.* Your Majesty says very true: if your Majesties is remembered of it, the Welchmen did good service in a garden where leeks did grow, wearing leeks in their Monmouth caps, which your Majesty knows to this hour is an honourable badge of the service; and I do believe your

Majesty takes no scorn to wear the leek upon Saint Tavy's day."—*Act 4, Scene 7.*

Worldidge gives a good idea of the love of the Welsh for these kinds of odoriferous vegetables. He says, "I have seen the greater part of a garden there stored with leeks, and part of the remainder with onions and garlic."

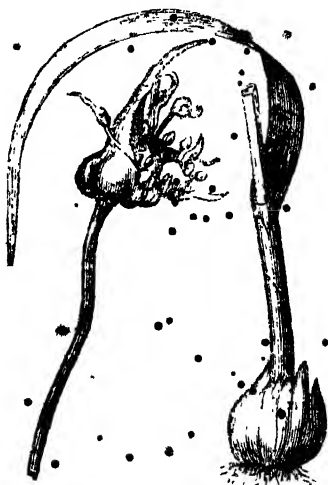
The hardiness and pungency of the leek both tend to recommend it in those countries where few potherbs are grown, and it seems to have great facility in adapting itself to climate. The leek which is cultivated in the colder parts of Scotland, and thence is called the Scotch leek, is more hardy and also more pungent than the broad-leaved variety, chiefly cultivated in England. It was formerly a very favourite ingredient in the "cock-a-leekie" of the Scotch, which is so graphically described in 'The Fortunes of Nigel;' and of which James the First is reported to have been so fond that he retained his preference for it notwithstanding all the dainties of London cookery.

This species requires more boiling than others of the same genus, and, unless it be reduced to nearly a pulp, it taints the breath in a very offensive manner. The offensive odour of a vegetable is, however, no evidence of unwholesomeness, provided the odour is natural to it, and not the result of putrefaction.*

The bulb of the leek consists of the bottoms of the leaves, which do not form in bulbules or cloves like those of the garlic, neither are they so entire as the tunics of the onion; the stem runs to the height of about three feet; the flowers, which are bell-shaped, appear in May, in large close balls, followed by capsules containing seeds. As the root of the leek is rather the blanched end of the leaves than a bulb, properly so called, the plant is to be considered chiefly as a potherb; though in some places both the root and the greater part of the leaves are eaten by the peasantry as an accompaniment to their bread. Its chief value, however, is as a potherb, which stands the winter well, and is in a forward and

* See the account of the Durion, p. 164.

succulent state at that part of the season when fresh vegetables are the least abundant. The culture of the leek is similar to that of the onion.



Garlic (*Allium sativum*).

GARLIC (*Allium sativum*) is the species from which the genus takes its name. It is very extensively used in most of the Continental states. This plant was first cultivated in England in 1548, and was held in greater repute by our ancestors than is in accordance with modern English taste. It is a native of the countries on the shores of the Mediterranean, and is still to be found growing wild in the island of Sicily and in the south of France. Though thriving best on a naturally rich and dry soil, garlic is a very hardy plant, and not very particular as to climate. Its leaves are linear, long, and narrow; the root is perennial, composed of twelve or fifteen lesser bulbs, enclosed in one common membranous tunic, and

easily separable from one another; these are called *cloves* of garlic, and are the only parts used. The whole plant, and especially the cloves, has a most acrimonious taste and offensive smell; and even in those countries where it is most in favour it is seldom eaten in substance, or even mixed in substance in those culinary preparations which it is intended to flavour. The garlic is generally only introduced during the cooking, for a time longer or shorter according to the intenseness of the flavour required, and is then withdrawn. This plant is readily propagated by the cloves or subdivisions of the bulbs which, if put into the ground in March, produce a crop in July or August.

Several species of garlic are found growing naturally in various countries. The wild garlic of Kamtchatka (*Allium ursinum*) is much prized by the inhabitants, both as a medicine and as an auxiliary article of food. The Russians, as well as the natives, gather it in large quantities for winter use. After being steeped in water, it is mixed with cabbage, onions, and other ingredients, the whole forming a ragout, which is eaten cold. This plant is there considered as almost a specific against the scurvy, no sooner lifting its head above the snow than the dreadful disease loses all its horrors; as even in its worst stages a cure is produced by the plentiful use of the wild garlic.

Three species, the sand-garlic, the crow-garlic, and the leek-garlic, are found native in some parts of Britain; but they are of little or no value, and have never been introduced into culture.

The SHALLOT (*Allium ascalonium*) is a native of warmer climates than that of England; it is found growing wild in many parts of Syria, especially near Ascalon, whence it derives its name. The time of its introduction into this country is not known; some writers assume that it was brought home by the Crusaders. It is mentioned as a well-known plant by Turner, in his 'Signes of Herbes,' published in 1548. This plant resembles the true garlic in having its roots divided into cloves or smaller roots, and enclosed in a thin membrane. Each

of these small roots sends forth two or three fistular awl-shaped leaves, issuing from a sheath; they are nearly similar, but not so large as those of the onion. The shallot does not in all situations produce perfect seeds, or even flowers, and sometimes, indeed, does not send up any footstalk. The want of seed is, however, fully compensated by the multiplication of the roots. It is sufficiently hardy to bear uninjured the severest winters of England, but it is liable sometimes to be attacked by insects. This evil is found to be surely prevented when the bulbs are planted rather above the surface, instead of being buried in the earth; and this improved mode of culture has a further advantage of bettering the quality and increasing the quantity of the crop obtained.

The flavour of the shallot is much more pungent than that of garlic, but not nearly so rank. It seasons soups and made-dishes, and makes a good addition in sauces, salads, and pickles.

ROCAMBOLE (*Allium scorodoprasum*), is a native of the northern parts of Europe, and is found in situations which are rather elevated. It has been cultivated in this country, though not very extensively, from a period much anterior to any annals of horticulture; the earliest records on this subject mention it as being a plant in common cultivation. It is a perennial, having narrow flat leaves, with the mark of a keel or ridge on the under sides. The flower-stem rises to the height of about two feet; the globular head, on its first appearance, is contorted. As the plant advances, however, the head untwists, and the flowers come to maturity; after which the spherical top changes into a cluster of small bulbules, which have a tinge of purple. The cloves of the rocambole, taken either from the root or the top of the flowering stalk, are the parts used; the latter being the largest in size; but those from the roots have the most pungency, especially when the whole of the bulb is buried in the earth.

Rocambole holds an intermediate place between garlic and shallot, and is applied to the same purpose as the latter.

CHAPTER XXVII.

SPICES, SEASONING HERBS AND PEPPERS, LETTUCE, ETC.

SPICES.—The plants which produce the more esteemed of these are all natives of tropical climates ; and with the exception of some of the capsicums, none of them can be fruited in the open air in this country, nor can the choicer sorts be brought to maturity even by artificial heat. These substances are either simply hot and acrid, in which case they get the name of peppers, or they have aromatic flavour in addition ; and when they have this, they are called spices, though, in some cases, the names are applied indiscriminately to the same substance.

Spices have always been regarded as luxurious acquisitions, while their small comparative bulk, and consequent facility of transport, caused them to be among the first articles of commerce obtained from remote countries. The inhabitant of more temperate regions has therefore, for ages, been in the enjoyment of most of the delicious aromatics fostered by a tropical sun.

The higher classes of the Romans used spices in more costly profuseness than the moderns, though the better knowledge of navigation, by producing a direct and frequent intercourse between nations, has now caused them to be sufficiently cheap, to place them within the reach of all ranks of society.

Among the ancients, spices of all kinds, as well as frankincense and myrrh, were made to lend their perfume to the wreathed smoke which ascended both from the altars of their gods and the funeral piles of their nobles. Prodigious quantities of frankincense and spices were thus consumed at the funeral of Sylla ; and Nero is said to have lavished more than a whole year's supply

in celebrating the obsequies of his wife Poppæa. The country of the Sabæans, situated in Arabia Felix, was celebrated for the abundance of these aromatic plants. "Among this people," says Pliny, "no other kinds of wood but those which sent forth sweet odour were used as fuel, and they cooked their food with the branches of trees yielding frankincense and myrrh."* The very ocean, it was said, was perfumed with the fragrance of their spices and aromatics. Agatharchidas, an ancient author, who wrote about two thousand years ago, gave a glowing description of this country. It is probable that his panegyric suggested to Milton the following simile :—

"As when to them who sail
Beyond the Cape of Hope, and now are past,
Mozambic, off at sea north-east winds blow
Sabæan odours from the spicy shore
Of Araby the Blest: with such delay
Well pleased they slack their course, and many a league
Cheered with the grateful smell, old Ocean smiles."

Although the ancient writers all agree that Arabia Felix has thus obtained its name from its odour-breathing plants, it is probable that their accounts are mostly fabulous, and that being but imperfectly acquainted with the regions beyond, they concluded that the country whence they procured their spicy luxuries must, of necessity, be the country of production. The spices which Queen Sheba presented to Solomon† were not known in Jerusalem, and were probably obtained from Ceylon, or the islands still farther to the east. It is, however, most certain, that, with but one or two exceptions, those of familiar use among the moderns were all originally derived from these latter countries.

CINNAMON (*Laurus Cinnamomum*) is said to be indigenous only to the island of Ceylon, and even there confined to a small district in the south-western part of

* Pliny, lib. xii. cap. 18. Tacitus, ALN., lib. xvi. cap. 6.

† 2 Chron. xi. 9.



True Cinnamon (*Laurus cinnamomum*).

that island. There are, however, doubts whether the inferior sorts, found in other places, known by the name of Cassia, and considered by botanists as a distinct species (*Laurus Cassia*), be not the very same tree, deteriorated by being produced on a soil and in a climate less adapted for the development of its finer qualities. Whether it be cinnamon or cassia, the bark of the tree, freed from the external part, forms the spice.

Although ever since the Dutch first had a settlement in Ceylon, cinnamon was made by them a lucrative article of trade, and one which they strove by every means wholly to monopolize, this tree was not made by them an object of cultivation in Ceylon until 1766.

Before that period cinnamon was collected in the forests and jungles, since an idea prevailed that its excellence depended on its spontaneous growth, and that if once subjected to culture it would no longer be genuine.*

When Falk was appointed Governor of Ceylon, he felt the inconvenience of depending for a regular supply on such a resource, the more especially as the greater part of the cinnamon-trees lay in the dominions of the king of Candy, who frequently, with or without apparent reason, refused the cinnamon-peelers admission into his dominions, and the Dutch were, in consequence, often restricted to less than half their required annual exports.

Governor Falk, in his attempt to remedy this evil, by cultivating the cinnamon-tree in the territory belonging to the Dutch, was discouraged by the prejudices of the natives, and discountenanced by the parsimony of the Supreme Government of Batavia. It was said, "For one hundred and fifty years Ceylon had supplied the requisite quantity of cinnamon, the expense of which was ascertained and limited: why then risk the success of a new plan, attended with extraordinary charges?" This public-spirited governor nevertheless persevered in his undertaking; and to his success the English owe the flourishing state in which they found the cinnamon plantations of Ceylon, when they captured that island. This tree is now cultivated in four or five very large gardens, the extent of which may in some measure be imagined by the quantity of cinnamon annually exported thence, amounting to more than 400,000 lbs.; and from the number of people who are employed in the cinnamon department, these being from twenty-five to twenty-six thousand persons.*

The trade in this produce had always been a monopoly; during the government of the Dutch this was enforced with an excessive degree of rigour, at which humanity revolts. It is painful to contemplate man, when greediness for exclusive gains, the meanest of all motives, incites him to acts of oppression and tyranny.

* Trans. of the Royal Asiatic Society, vol. i.

"The selling or giving away the smallest quantity of cinnamon (even were it but a single stick), the exporting of it, the peeling of the bark, extracting the oil either from that or the leaves, or the camphor from the roots, except by the servants of the government, and by their order, as well as the wilful injuring of a cinnamon-plant, were all made crimes, punishable with death, both on the persons committing them, and upon every servant of government who should connive at it."*

In order to keep up the price of the spices, the Dutch government was formerly accustomed to have these destroyed, when supposed to be accumulated in too large quantities. Sometimes, it was said, this Oriental produce was thrown into the sea, and sometimes the work of destruction was accomplished by other means. M. Beaumarc relates, that on the 10th June, 1760, he beheld, near the Admiralty at Amsterdam, a blazing pile of these aromatics, which were valued at eight millions of livres, and an equal quantity was to be burnt on the ensuing day. The air was perfumed with this incense, the essential oils, freed from their confinement, distilled over, mixing in one spicy stream, which flowed at the feet of the spectators; but no person was suffered to collect any of this, nor on pain of heavy punishment to rescue the smallest quantity of the spice from the wasting element!

When in its natural state, the cinnamon-tree attains to the height of twenty or thirty feet, sending forth large spreading branches clothed with thick foliage. The leaf, when first developed, is partly of a bright red, and partly of a pale yellow; it soon, however, assumes a verdant hue, and when at its full growth is on the upper surface of a dark olive colour, and on the under side of a lighter green; it somewhat resembles that of the bay, but is longer and narrower. The flowers bloom in January; they grow on footstalks, rising from the axillæ of the leaves and the extremities of the branches, clustering in bunches, which resemble in size and shape those of the lilac, but they are white, with a brownish

* Bertolacci's Ceylon, p. 241.

tinge in the centre; these are followed by one-seeded berries, of the shape of an acorn, but not so large as a common pea. When first gathered their taste resembles that of the juniper-berry. When dry, this fruit becomes merely a thin shell, containing a kernel about the size of an apple-seed. The smell of the flowers, though not powerful, is extremely fragrant. The footstalks of the leaves have a strong flavour of cinnamon. The fruit, if boiled, yields an oil, which when cold becomes a solid substance like wax, and is formed into candles; these emit an agreeable odour, and in the kingdom of Candy are reserved for the sole use of the court.

The trees which are cultivated are kept as a sort of coppice, and numerous shoots spring apparently from the roots; these are not allowed to rise higher than ten feet. We are told that "when the trees first put forth their flame-coloured leaves and delicate blossoms, the scenery is exquisitely beautiful." In three years after planting each tree afford some shoot fit for cutting; at the fifth year, from three to five shoots may be taken; but it requires the vigour of eight years' growth before it yields as many as ten branches of an inch in thickness. From the ages of ten to twelve years is the period of its greatest perfection; but its duration of life is not limited, as the root spreads, and every year sends up new shoots or suckers.

Trees which grow in rocky situations, and the young shoots, when the leaves are of a reddish colour, yield the the best and most pungent aromatic bark. The tree is known to be in the best state when the bark separates easily from the wood, and has the inside covered with a mucilaginous juice; but if that be not carefully removed, the flavour of the spice is injured. The shoots are cut when from half to three-quarters of an inch in thickness, and in lengths of from two to three feet. Many hands are employed in this work; each man is obliged to furnish a certain quantity of sticks. When this part of his task is fulfilled, he conveys his fragrant load to a shed allotted for the purpose, where the bark is instantly stripped from the wood, and freed from the epidermis,

which is scraped off. The fragrance diffused around during this process, is described as being extremely delightful; but in parts of the plantation remote from this spot, unless the trees be agitated with violence, the peculiar smell of the cinnamon cannot be distinguished.* The wood, deprived of the bark, has no smell, and is used as fuel.

When the bark is perfectly cleansed it is of a pale yellow colour, and about the thickness of parchment. It is then placed on mats, to dry in the sun, when it curls up, and acquires a darker tint. The smaller pieces are then put inside the larger, and the whole close together into the tubular form in which it is sold in the shops. When the rind, or part forming the cinnamon, is first taken from the tree, it is described as consisting of an outer portion which tastes like common bark, and an inner portion, which is very sweet and aromatic. In the course of the drying, the oil of the inner portion, on which the flavour depends, is communicated to the whole; and the quality of the entire bark is understood to depend more upon the relative quantities of those portions of the bark than upon anything else. The cinnamon of Ceylon has the outer portion much thinner, in proportion to the inner, than the cassia of other countries; and to that its higher pungency is attributed.

Under favourable circumstances, the cinnamon-tree yields a large and a small harvest every year. The large one is obtained soon after the fruit is ripe; that is, when the tree has again pushed out shoots, and the sap is in vigorous circulation. May and June are the best months in the year for the great harvest: in November and December the little harvest is obtained. In those plantations which belong to government, however, there is but one harvest, beginning in May, and ending in October.

Though cinnamon has found a place in our Pharmacopœia, the purpose to which it has been applied by the South Americans invests it with medicinal properties

* Cordier's Ceylon.

which it is not usually supposed to possess. "One thousand bales (92,000 lbs.) are said to be consumed annually by the slaves in the mines of South America. Each receives daily a certain quantity, cut into pieces one inch in length, which he eats as a preservative against the noxious effluvia of the mines.*.

Oil of cinnamon was formerly obtained at Colombo, from distilling the fragments broken off in packing; latterly a great proportion has been made from coarse cinnamon unfit for exportation. A very small quantity of oil is contained in the bark; three hundred pounds of which are required to yield twenty-four ounces of oil,† and consequently this is extravagantly dear. When made from the finest cinnamon its specific gravity is greater, but from the coarse sort it is less than that of water.

CASSIA (*Laurus Cassia*) is a native of several parts of the south of Asia, but it is chiefly brought from China as an article of commerce. The bark and buds are known in commerce as *cassia lignea* and *cassia buds*; these have the same aroma though in an inferior degree to cinnamon, and it is said that they are in many cases very extensively substituted for the latter. They are both imported into this country to a very large amount.

The CLOVE (*Caryophyllus aromaticus*) is a native of most of the Molucca Islands, where it has been produced, from the earliest records, so abundantly, that in exchange for their spicy produce the inhabitants were enabled, before the intrusion of the Europeans into their country, to procure for themselves the productions which they required of almost every other region. Although Europeans have for more than two thousand years known the use of this spice, yet little more than three hundred years back they were ignorant whence it was obtained. The Persians, Arabians, and Egyptians formerly brought cloves and nutmegs to the ports in the Mediterranean, and hither the Venetians and Genoese resorted to buy the spices of India, until the Portuguese, in 1511, discovered the country of their production. This nation

* Cordiner's Ceylon.

† Ibid.



The Clove (*Caryophyllus aromaticus*).

did not, however, long enjoy the fruits of its discovery ; the Dutch soon drove them from the Moluccas, and for a long time retained a very strict monopoly over the productions of these islands. It is said that they destroyed the clove-trees growing on the other islands, and confined their culture wholly to Amboyna. They allotted to the inhabitants four thousand parcels of land, on each of which it was expected that one hundred and twenty-

five trees should be cultivated; and in 1720 a law was passed compelling the natives to make up this number: there were in consequence five hundred thousand clove-trees planted in this small island; each of these on an average produced annually more than two pounds of cloves, so that the aggregate produce weighed more than a million of pounds. Subsequently to this period, the policy of the Dutch somewhat relaxed, and the tree has been suffered to grow on other islands, and even to be carried to the West Indies, where, however, it does not appear until very lately to have succeeded. Sir Joseph Banks introduced it into this country about 1797, but of course it is raised here only as a mere ornament or curiosity of the hothouse.

The clove is a handsome tree, somewhat like the bay-tree in some of its characters, though the leaves more nearly resemble those of the laurel. The flowers of the clove grow in bunches at the very extremity of the branches; when they first appear, which is at the beginning of the rainy season, they are in the form of elongated greenish buds, from the extremity of which the corolla is expanded, which is of a delicate peach-blossom colour. When the corolla begins to fade, the calyx turns yellow, and then red; the calyces, with the embryo seed, are in this stage of their growth beaten from the tree, and, after being dried in the sun, are what are known as the cloves of commerce. If the fruit be allowed to remain on the tree after arriving at this period, the calyx gradually swells, the seed enlarges, and the pungent properties of the clove are in great part dissipated. Each berry contains only one seed, which is oval, dark-coloured, and of a considerable size. It is a long time before a clove-tree yields any profit to the cultivator, it rarely producing fruit till eight or nine years after being first planted.

The whole tree is highly aromatic, and the footstalks of the leaves have nearly the same pungency as the calyx of the flowers. "Clove-trees," says Sir T. Raffles, "as an avenue to a residence are perhaps unrivalled—their

noble height, the beauty of their form, the luxuriance of their foliage, and, above all, the spicy fragrance with which they perfume the air, produce, on driving through a long line of them, a degree of exquisite pleasure only to be enjoyed in the clear light atmosphere of these latitudes.

Cloves contain a very large proportion of essential oil, larger perhaps than any other plant or parts of a plant. This oil is extremely pungent, and is one of the few essential oils which is specifically heavier than water. It is usually procured by distillation, but when the cloves are newly gathered it may be obtained by pressure. A part is often so taken, and the cloves, which are thereby rendered of little value, are fraudulently mixed with sound ones; but the robbed cloves are easily detected by their pale colour, shrivelled appearance, and want of flavour.

The pungent and aromatic virtues of the clove reside in this essential oil, combined with the resinous matter of the spice; but it does not appear that these qualities are absolutely necessary to the growth or fructification of the tree. To give to this its greatest value, it must, however, be cultivated in a situation where they can be elaborated in the greatest quantity. Its profitable growth is therefore limited to a very narrow range of temperature and climate; as the clove loses its flavour if the situation be too moist or too dry, too near the sea, or too much elevated above its level. Though the tree be found in the larger islands of Eastern Asia and in Cochin-China, it has there little or no flavour. The Moluccas seem to be the only places where the clove comes to perfection without cultivation.

This tree is so great an absorbent of moisture, that no herbage will grow under its branches; while the cloves, when gathered, if placed in a heap near a vessel of water, are found very much to have increased their weight at the end of only a few hours, in consequence of the large portion of water which they have attracted and imbibed. It is said that both the grower and trader in cloves sail

themselves of the knowledge of this fact, and since this spice is always sold by weight, thus give a factitious value to their goods.



Nutmeg (*Myristica moschata*).

THE NUTMEG (*Myristica moschata*) is likewise a native of the Moluccas, and after the possession of these islands by the Dutch, was, like the clove, jealously made an object of strict monopoly. Actuated by this narrow-minded policy, the Dutch endeavoured to extirpate the nutmeg tree from all the islands except Banda; but it is said that the wood-pigeon has often been the unintentional means of thwarting this monopolizing spirit by conveying and dropping the fruit beyond these limits; thus disseminated, the plant has been always more widely diffused than the clove. This tree grows in several islands in the Eastern Ocean, in the southern part of both peninsulas of India, and it has been introduced into

the Mauritius and some other places. It was for a long time supposed that though the plant could be transplanted, the peculiar aroma of the nut, which gives to the tree its commercial value, was weakened, if not entirely lost, when this was removed from its native soil, and that, as a spice-producing tree, it, as well as the clove, was confined to the same narrow locality to which the clove was said to be restricted. In Sumatra, however, it has been successfully cultivated to a large extent. Sir Thomas Raffles gives an account of the plantation at Bencoolen in 1820 :—" Out of the number of one hundred thousand nutmeg-trees," he writes, " one fourth are in full bearing, and although their culture may be more expensive, their luxuriance and produce are considered fully equal to those of the Moluccas." An attempt has been made at Trinidad to naturalize there the clove and the nutmeg; and, very recently, samples of these spices produced in that island have been transmitted to England, for the inspection and approval of the Society for the Encouragement of Arts, &c. The opinions of the best judges have been taken with respect to their quality as compared with the Oriental produce, and, in consequence of a most favourable report, the gold medal of the Society has been awarded to the western cultivator of these spices; while sanguine hopes are entertained that the clove and the nutmeg will one day be perfectly acclimatized in the tropical regions of the Western Hemisphere. The nutmeg-tree, as well as the clove, was introduced into this country by Sir Joseph Banks, as an ornamental hothouse plant.

Two spices are obtained from the nutmeg-tree—*nutmeg*, which is the kernel of the fruit; and, *mace*, which is the membranous tunic or covering immediately investing the thin black shell in which the nutmeg is contained; the whole is enveloped by the external portion of the fruit in the same manner as the stone of a peach is by the pulp. This tree is larger than that of the clove; the leaves are more handsome in the outline, and are broader in proportion to the length. They are of a fine green on the upper surface, and grey beneath.

When the trees have attained the age of about nine years they begin to bear. They are dioecious, having male or barren flowers upon one tree, and female or fertile upon another. The flowers of both are small, white, bell-shaped, and without any calyx; the embryo fruit appearing at the bottom of the female flower, in the form of a little reddish knob. The female flowers grow on slender peduncles, two or three together, but it is rare that more than one flower in each bunch comes to maturity and produces fruit; this resembles in appearance and size a small peach, but it is rather more pointed at both ends. The outer coat is about half an inch thick when ripe, at which time it bursts at the side and discloses the spices. These are—

The Mace, having the appearance of a leafy network of a fine red colour, which seems the brighter by being contrasted with the shining black of the shell that it surrounds. In general, the more brilliant its hue the better is its quality. This is laid to dry in the shade for a short space; but if dried too much, a great part of its flavour is lost by evaporation, while it is also more apt to break in packing. On the other hand, if packed too moist, it either ferments or breeds worms. After being dried, it is packed in bags and pressed together very tightly.

The Nutmeg. The shell is larger and harder than that of a filbert, and could not, in the state in which it is gathered, be broken without injuring the nut. On that account the nuts are successively dried in the sun and then by fire-heat, till the kernel shrinks so much as to rattle in the shell, which is then easily broken. After this, the nuts are three times soaked in sea-water and lime; they are then laid in a heap, where they heat, and get rid of their superfluous moisture by evaporation. This process is pursued to preserve the substance and flavour of the nut, as well as to destroy its vegetative power. Dry lime is the best package for nutmegs.

There are two varieties, the royal and the green. The royal is the largest, and it produces mace longer than the nut; on the nut of the green the mace reaches only half.

way down. A good nutmeg should be large, round, and heavy, of a light grey colour, and finely marbled in the cross section.

- c Oil of nutmegs is obtained by pressure from the broken kernels; a pound of them generally yields three ounces of oil. According to Neumann's experiments, the oil produced is one-third of the weight of nutmeg; it is yellow, of the consistence of tallow, and of a pleasant smell. This is a fixed oil, but a transparent volatile oil may likewise be obtained by distillation, in the proportion of $\frac{1}{2}$ part of the weight of nutmeg used.

There are other spices natives of the Moluccas; the principal of these are Macis, bark, and a species of cinnamon, or cassia; but these, though much used in Chinese and Japanese cookery, are of inferior consequence, and nearly confined to the commerce of the East.

GINGER (*Zingiber officinale*) is a native of the south-east of Asia and the adjacent isles. It was naturalized in America very soon after the discovery of that country by the Spaniards; indeed, at so early a period that it is scarcely believed to be an exotic, and is supposed to have been found indigenous in the Western World. Acosta relates that a person named Francisco de Mendoza first transplanted it from the East Indies into New Spain, where its cultivation was diligently pursued by the Spanish Americans to no small extent, as, from the testimony of the same author, 22,053 cwt. were exported thence to Europe in the year 1547.*

The plant is now cultivated in great quantities in the West Indies, especially in the island of Jamaica. Ginger is imported into this country under the form of dried roots and as a preserve. We receive it both from the East and West Indies, but that from the latter is much superior in quality to the former. British plantation ginger pays even shillings per cwt. import duty, and all other is not admitted under fifty-three shillings per

c.

* Edwards's West Indies, vol. ii.



Ginger (*Zingiber officinale*).

cwt. ; these two causes unite in confining the home consumption of ginger almost entirely to that coming from the West Indies.

The ginger plant has been cultivated in this country as a stove exotic since about the year 1600. It has a perennial root, which creeps and increases under ground in tuberous joints, from each of which arises in the spring a green reed-like stalk of about two feet and a half in height, having narrow and lanceolate leaves. The stem is annual ; the flowering stalk rises directly from the root, ending in an oblong scaly spike ; from each of these scales a single white and blue flower is produced. The ginger of commerce is distinguished into black and

white; but the difference of colour depends wholly on the modes of preparation. For both of these kinds the tubers are allowed to be ripe, that is, the roots are taken up after the annual stalks are withered. For the black, they are scalded in boiling water and then dried in the sun; and for the white, they are scraped clean and dried carefully without being scalded. The best and soundest roots are selected for the latter process, and therefore white ginger is, independent of the manner of preparation, superior to the black, and it always bears a much higher price in the market. When a preserve is to be made of the roots, they are dug up in the sap, the stalks not being then more than five or six inches long. For this purpose the young roots are scalded, then washed in cold water, and afterwards carefully peeled. This process lasts for three or four days, during which period the water is frequently changed.

When the cleansing is complete, the tubers are put into jars, and covered with weak syrup of sugar. After a day or two the weak syrup is removed, and replaced by a stronger; and the shifting is two or three times repeated, increasing the strength of the syrup each time. The preserve thus formed is one of the finest that is made; and the removed syrups are not lost, but fermented into a pleasant liquor, which gets the name of "cool drink."

The manner of cultivating ginger is extremely simple, requiring little skill or care; it is propagated with as much ease and nearly in the same manner as potatoes are in Great Britain.

PEPPER (*Piper*).—The species of this genus are very numerous—botanists describing about sixty—some of which are to be found in every quarter of the world except Europe. The *Piper nigrum* produces the black and white pepper of commerce. This pepper-bush is a perennial plant found native upon the slopes of mountains in the southern parts of both the Indian peninsulas, especially on the coast of Malabar. It is likewise cultivated to a great extent in Sumatra, Java, and the adjacent places. Pepper at one time formed the principal

export from Java ; it was chiefly cultivated in Bantam and likewise in the dependencies of that province in the southern part of Sumatra ; these districts producing the greater part of the supply exclusively furnished by the Dutch to the European market. It is, however, a satisfaction to find that the greedy spirit which would appropriate all to self, may sometimes, in its unjust efforts to secure this end, defeat its own purpose. We learn from Sir T. S. Raffles, that "the system by which it (pepper) was procured, was too oppressive and unprincipled in its nature, and too impolitic in its provisions, to admit of long duration. It was calculated to destroy the energies of the country, and with them the source whence the fruits of the monopoly proceeded. In the year 1811, accordingly, neither Bantam nor its dependencies furnished the European government with a single pound of this article."

The system of raising pepper in Java is now, however, completely changed ; there is no longer a monopoly, and the cultivation of pepper has for the last few years been declared free.

This plant was introduced some time back at Cayenne, by General Bernard, who has with unceasing perseverance attended to its cultivation in that settlement, in the hope of making the French independent of foreign supply for its produce. It is said that he has already formed a plantation of more than thirty thousand pepper-trees on his estate.†

The pepper-plant, or pepper-vine, as it is sometimes called, is a creeping or climbing plant, with a dark-coloured stem, which requires support. When dry it exactly resembles the grape-vine branch, having the same sort of knots or joints. It is usual to plant a thorny tree by the side of this plant, to which it may cling. In Malabar, the chief pepper country of India, the Jacca-tree (*Artocarpus integrifolia*) is made thus to yield its sup-

* History of Java, vol. i. p. 131.

† La Guigne Française for 5th January, 1825.

port, because the same soil is well adapted to the growth of both plants.

The stem of the pepper-plant entwines round its support to a considerable height; the flexile branches then droop downwards, bearing at their extremities, as well as at other parts, spikes of green flowers, which are followed by the pungent berries; these hang in large bunches resembling in shape those of grapes, but the fruit grows distinct on little stalks like currants. Each berry contains a single seed, which is of a globular form and brownish colour, but changes to nearly a black when dried—this is the pepper of commerce. The leaves somewhat resemble those of the ivy, but they are larger, and of rather a lighter colour; they partake strongly of the peculiar smell and pungent taste of the berry.

The plant is propagated by shoots, which do not produce fruit the first three years; the fourth year they come into bearing, and yield an increase of produce annually until the eighth year of their growth; they then gradually decline, and rarely bear for more than two or three years longer. When in full vigour, the pepper-plant is very prolific; each bunch usually contains from twenty to thirty berries, and sometimes as much as six or seven pounds of pepper are obtained from one tree. The time of the pepper-harvest on the western coast of Sumatra is usually about September and October, and sometimes another smaller crop is gathered in March and April. The pepper-plantations on this island are described as being most carefully cultivated; not a weed is to be seen, every species of litter is removed, and, if the season be dry, the plants are watered with unremitting assiduity.

The black and white sorts of pepper are both the produce of the same plant; the best white peppers are supposed to be the finest berries which drop from the tree, and lying under it, become somewhat blanched by exposure to weather—these the poor people pick up and bring to the merchants; they are, however, obtained in very small quantities, and are on that account, as well as

for their superior quality, sold much dearer than the gathered pepper. The greater part of the white pepper used as a condiment, is, however, the black merely steeped in water and decorticated, by which means the pungency and real value of the pepper are diminished; but in this state it can be more readily reduced to powder, and, when thus prepared, it has a fairer and more uniform appearance.

The pepper is distinguished in Sumatra into three sorts: the *Molucca*, which is the best; the second, *Craytongee*; and the worst sort, *Negaree*, which last is the most abundant; this is a small pepper usually full of dust; it is much lighter than the others, and therefore, unless the buyer be wise enough to purchase this pepper by weight instead of measure, he will assuredly be imposed upon, and have this substituted for the heavy Molucca berry.

By distillation, a green coloured matter is obtained from pepper; this is partly resinous, and partly oily, and to this the pepper owes its pungent quality.*

Several other species of this genus are used besides the *P. nigrum*. The southern Asiatics wrap up the slices of the areca-nut, which they are in the habit of chewing, in the leaves of the beetta coli (*Piper betle*), which is a native of India and China. Some species are likewise found in the West Indies and in South America; they are used there to season food, but are not at present known in commerce.

PIMENTO, JAMAICA PEPPER, OR ALLSPICE TREE (*Myrtus pimenta*), is an extremely handsome tree; native of South America and the West Indies—especially of the island of Jamaica, whence the berries, or pimento of commerce, are exported in large quantities. This tree grows to the height of about thirty feet, with a smooth brown trunk, and shining green leaves, resembling those of the bay; branches, coming out on all sides, are clothed in the most luxuriant foliage. In the months of July and August a profusion of white flowers pleasingly contrast with the dark green leaves—the whole forming an object



Allspice (*Myrtus pimenta*).

of vegetable beauty rarely surpassed ; while the rich perfume which is exhaled around, and which, is wafted by the gentlest breeze, renders an assemblage of these trees one of the most delicious plantations of even a tropical clime. When the leaves are bruised, they emit a fine aromatic odour as powerful as that of the fruit ; indeed it is said that they yield by distillation a delicate oil which is often used in the dispensaries as a substitute for oil of cloves.

The pimento-tree grows spontaneously in many parts of Jamaica ; it abounds more particularly on the northern side of that island in elevated spots near the coast. When a new plantation of these is to be formed, no regular planting or sowing takes place ; it is usual to appropriate a piece of land either in the neighbourhood of a plantation already formed, or in a part of the woodlands where these trees are scattered in a native state. The land is then cleared of all wood but these trees, which are left standing, and the felled timber is allowed to remain where it falls to decay and perish. In the course of a year young pimento plants are found springing up on all parts of the land ; produced, it is supposed, in consequence of the ripe berries having been scattered there by the birds, while the prostrate trees protect and shade the tender seedlings. At the end of two years the land is thoroughly cleared, only those plants being left which promise a vigorous growth ; these come to maturity in about seven years from the first formation of the plantation, and usually attain to the height of thirty feet. But though apparently of so easy propagation, it is only in those parts where the tree is of spontaneous production. Edwards observes that " this tree is purely a child of nature, and seems to mock all the labours of man, in his endeavours to extend or improve its growth : not one attempt in fifty to propagate the young plants, or to raise them from the seeds, in parts of the country where it is not found growing spontaneously, having succeeded." The tree was introduced into this country in the early part of last century, but the fruit does not ripen. It is delicate and difficult to manage, requiring at the same time warmth and a great deal of air.

The flowers scarcely fade and give place to the berries, ere these are fit for gathering ; since, if the fruit be suffered to ripen on the tree, it loses its pungency and becomes valueless. While yet green, therefore, the berries are carefully picked by hand ; one person on the tree gathers the small branches ; and three others, usually women and children, find full employment in picking the berries from these. The produce is then spread on ter-

raced floor, and exposed to the action of the solar heat for about a week ; in the course of this time the berries lose their green hue, and become of a reddish brown. When perfectly dry, they are in a fit state for exportation.

In a favourable season the pimento crop is enormous. "A single tree has been known to yield one hundred and fifty pounds of the raw fruit, or one hundredweight of the dried spice ; there being commonly a loss in weight of about one-third in curing." This return is not, however, of very usual occurrence, as the produce is variable ; a very plenteous harvest seldom occurring above once in five years.

Pimento combines the flavour and properties of many of the Oriental spices, hence its popular name.

The CAPSICUM is a native of tropical regions, but is become so far acclimatized in this country as to be successfully reared, and during summer to endure the open air uninjured.

Three species of capsicum are cultivated in England. The GUINEA PEPPER (*Capsicum annum*) was introduced into England, from India, so early as 1548, and is mentioned by Gerard as being under cultivation in his time. This plant has a branchy stem, rising about two feet high ; the leaves are long, narrow, and of a dark green colour. White flowers bloom in June or July, and are succeeded by pods varying in shape and colour ; some being long, others short, some round, and others again heart-shaped, while the colour is either red or yellow.

The CHERRY PEPPER (*Capsicum cerasiforme*) is a native of the West Indies, and was not cultivated in England until 1759. This species is very similar in appearance to the first, and is only characterized by the different shape of the pods, which take somewhat the form of a cherry ; sometimes heart-shaped, bell-shaped, or angular ; their colour is the same as the preceding. Both these species are annuals.

The BELL PEPPER (*Capsicum grossum*) is a biennial, a native of India ; it produces larger pods than either of the others. It may be transplanted with safety in the



Capsicum (*Capsicum annuum*).

open garden, on the arrival of summer, but it requires a place in the stove during the winter season.

The green pods of all these varieties are used for pickling; those of the last are generally preferred, being not only larger, but having the skin more pulpy and tender.

SEASONING HERBS.—Vegetables of this description are never used with any reference to their substantive qualities, as articles of food. They are employed merely for their flavour, forming subordinate ingredients in the culinary

art, and are respectively applied in various combinations according to the skill or the pleasure of the operator.

Many of this class of plants were formerly much esteemed for their real or imaginary medicinal virtues, and some of them are in the present day considered of sufficient value to be ranked among pharmaceutic simples.

PARSLEY (*Apium petroselinum*) was known to the Greeks, and received its distinctive name of *petroselinum* from Dioscorides. It is said to be a native of Sardinia, whence it was brought into England about the middle of the sixteenth century; but the plant is of so ancient culture in this country, that the period of its introduction cannot, perhaps, be accurately assigned, and though supposed not to be indigenous to Britain, it is now completely naturalized in various parts both of England and Scotland. It is a hardy biennial plant.

The principal varieties are the common plain-leaved, the curled-leaf, and the Hamburg or broad-leaved. The plain-leaved parsley was the first known in this country; but it is not now much cultivated, since the leaves are not so handsome as those of the curled, are of a less brilliant green, and are coarser in flavour. Another reason for banishing it from the gardens is its resemblance to fool's-parsley, or lesser hemlock, *Æthusa cynapium*, which is a noxious weed of a poisonous nature, infesting gardens and fields. If this intruder were growing among plain parsley, an unobservant person might confound the leaves of the one with the other, although they differ somewhat in shape and colour; the leaves of the poisonous plant being of rather a darker green, and, if bruised, they emit an unpleasant odour, very different to that of parsley. When in flower they are easily distinguished, the *æthusa* having an involucrem of three long, narrow, sharp-pointed leaflets, hanging down under every partial umbel, and vulgarly termed the *beard*; while in the garden-parsley there is usually only one leaflet at the general umbel, and at the partial umbel the involucrem consists of only a few short folioles, almost as fine as hairs.

Parsley is raised from seed, which is sown in the early

part of spring, most generally in single drills, round the edges of any of the vegetable beds. The plants appear in three or four weeks, and soon the tender leaves are fit to be gathered for use; a succession springing forth and furnishing a supply throughout the whole of the year, till the ensuing May, when the flower stalks begin to run, bloom, and bear seed in July or August.

Parsley has been supposed to be an effectual cure for the rot in sheep, provided it be given to them in sufficient quantities. Attempts were made some years ago to promote its extensive culture in fields for this purpose, under the auspices of the Society for the Encouragement of Arts, &c. It is said that this specific was tried in Hampshire with success; and Mortimer* mentions the cultivation of parsley, as a remedy against this destructive disease, being practized in Buckinghamshire. This herb, when used as food for sheep, imparts to their flesh, it is said, a very agreeable flavour.†

Hares and rabbits, we are told, will come from a great distance in order to indulge their taste for parsley; and in countries where these animals abound, in no situation does their favourite herb escape from their depredations, unless securely fenced.

PURSLANE (*Portulaca oleracea*) was introduced from South America into this country in 1652. It was formerly held in more esteem, and was more cultivated than it is at present.

FENNEL (*Anethum fœniculum*) is a plant of very ancient use, and if not native, is at least naturalized in England, where it is sometimes found growing on chalky soils. It is a perennial, rising to the height of five or six feet. The leaves are divided into a variety of fine, long segments, of a bright green colour. Yellow flowers, growing in umbels, appear in July and August. The whole plant has a strong and disagreeable odour. Its light and delicately-formed leaves are occasionally used.

* Mortimer's Husbandry, vol. i.

† Campbell's Pol. Survey, vol. vi.

as a garbish; and, when boiled, enter into the composition of certain fish-sauces.

HORSE-RADISH (*Cochlearia armoracia*) is a native of some marshy situations in Britain, where it may be found of spontaneous growth. It has long been an inmate of our gardens, and is well known with its large oblong leaves, sometimes entire round their edges, and sometimes deeply serrated. White cruciform flowers, growing in loose panicles, bloom in the beginning of summer. This plant is made the object of careful cultivation among market-gardeners, who find that its most congenial soil is a deep sandy loam. It is propagated by offsets, planted in February, and in the autumn of the ensuing year the roots are fit for use.

MINT (*Mentha*) is a perennial plant, of which there are many species and varieties. They are all indigenous to Britain, and chiefly delight in low moist situations. They are all more or less aromatic in the scent, and pungent in the flavour. Many of them yield sharp volatile oils by distillation. With very few exceptions, the whole of this description of plants is perennial, though the leaves in some, and the flowering stem in most, die down in the winter. They are all native plants, and their qualities are pungent and agreeable, not one of them being in the least degree poisonous; thus, whenever their taste is such that they can be used as giving flavour to food, that application may always be made with perfect safety. Much of the natural fragrance of the fields is owing to the *Labiata*, the family to which these sweet herbs belong. The various species of thyme impart their grateful odours to the arid wastes; the balmy calamint and others of the same genus diffuse their aromatic sweets over the cultivated fields; and the mints correct the effluvia arising from stagnant pools in marshy lands.

SPERMINT, or common mint (*Mentha viridis*), **PEPPERMINT** (*Mentha piperita*), and **PENNY-ROYAL MINT** (*Mentha pulegium*), are the principal species of mint. All are propagated either by parting at the root, by

offsets, or by cuttings. When designed for distillation, the stalks should not be gathered until they have attained their full growth, and are beginning to bloom; they should then be used as soon as cut. The same roots will send forth annual stalks for many years without degenerating.

THYME (*Thymus*). Two species are found natives of Britain, the *Thymus serpyllum* and *Thymus acinus*; but that which is cultivated in our gardens, *Thymus vulgaris*, is a native of Spain and other parts of Southern Europe. The climate of Spain seems peculiarly genial to the growth of all sweet herbs. At Marvella, about midway between Malaga and Gibraltar, De Laborde speaks of "sage, thyme, marjorum, lavender, myrtle, and rosemary, more than six feet high, embalming the air on all sides."* Thyme was introduced into this country certainly before the middle of the sixteenth century, but how long previous to that period is not ascertained. This herb is well known as a low shrubby evergreen, of a strongly aromatic odour. When of the largest growth it scarcely attains to a foot in height. Its minute leaves are smooth and oval, and the flowers are smaller than those of the wild thyme. Three varieties are usually cultivated, and distinguished as the broad, the narrow, and the variegated leaved.

Two or three tufts of another species, the Lemon Thyme (*Thymus citriodorus*), sometimes finds a place in the herb compartment of the kitchen-garden. This is a trailing evergreen, of still smaller growth than the common kind, and is remarkable for its smell, which resembles that of the rind of lemons, whence its distinctive name. Both the species thrive best in a dry soil. They are propagated most generally from seed; but they can likewise be multiplied by slips, or by parting the roots.

This herb is used in many savoury preparations. It was employed by the Romans to give its peculiar aromatic flavour to cheese,—a practice pursued likewise with some

flowers and seeds of other plants. This manner of preparing cheese was still continued during the middle ages. We collect this from an anecdote told of Charlemagne, who, travelling unattended, arrived at a bishop's palace. It was unfortunately a fast-day, and the only fare which the bishop would set before his royal guest was bread and some choice cheese; this the king did not appear particularly to relish, picking out with his knife small specks, which he mistook for unsound parts, but which, in fact, were parsley seeds. The prelate ventured to hint that he was throwing away the best parts of the cheese; when the monarch tasted it, and liked it so much, that he requested the bishop to send him an annual supply of this excellent flavoured curd; and, lest the cheese-merchant might by chance pack cheeses without any admixture of seeds, the king desired that they might always be cut in two, in order to ascertain the fact, and be then fastened together again with a skewer.* The mountaineers in the canton of Glaris, in Switzerland, prepare a cheese known by the name of Schabzieger, which is readily distinguished by its peculiar marbled appearance and aromatic flavour; these are communicated by the pressed flowers or the bruised seeds of the *Melilotus officinalis*.

SAGE (*Salvia officinalis*) is a native* of the warmer parts of Europe, but it has long been cultivated in Britain. Gerard notices it as being, in 1597, a well-known herb of the English garden. It is a hardy plant, but, though a perennial, does not last above three or four years without degenerating. New plantations are readily made by cuttings of the young shoots taken in the latter end of spring.

This aromatic herb is chiefly used with the more strong and oily kinds of food, as a mixture in stuffings and an ingredient in sauces. The leaves are sometimes introduced into English cheese.

A species of sage (*Salvia pomifera*), of a very peculiar growth, is common to some of the Greek islands.

* Foreign Review, and Continental Miscellany.

It has firm fleshy tumours, of about three-quarters of an inch in thickness, swelling out from the branches of the plant, and supposed to be produced in the same manner as oak-apples, by the puncture of an insect of the *Cynips* genus. These excrescences are semi-transparent, like jelly. They are called sage-apples, and under that name are always to be met with in the markets as an article of ordinary sale. They are made into a kind of conserve, which is highly esteemed by the Greeks. Dr. Clarke, in the sixth volume of his Travels, mentions having been regaled with this delicacy by the English consul at the island of Syros, and he bears testimony to its excellence. This plant is considerably larger than the common sage of our gardens, and its flavour and smell are much more powerful. It grows very abundantly in Candia, Syros, and Crete, where it attains to the size of a small shrub.

CLARY (*Salvia sclarea*) is a biennial plant, a native of the south of France, of Switzerland, and of Italy. It was first introduced into English cultivation in the year 1562.

MARJORAM (*Origanum*). The common marjoram, or *Origanum vulgare*, is a native of Britain; it is a perennial under-shrub, growing among copsewood in calcareous soils. The leaves are small and acute. The flowers are slightly red, and appear in July and August, in smooth clustered spikes. The winter marjoram (*Origanum heracleoticum*) very much resembles the above species in appearance; but it is of a more aromatic flavour, and is always used in preference. It is indigenous to Greece, whence it was introduced into this country in 1640. A sheltered dry situation is most favourable to its growth. The seeds of this and of the two following species seldom come to maturity in England. Winter marjoram is, therefore, usually propagated by cuttings. Sweet marjoram, *Origanum majorana*, was an inhabitant of the English garden about seventy years prior to the first cultivation in this country of the above species. It is a biennial, having its flowers growing in close knotted-like heads. As soon as it blos-

soms, this plant is cut and dried for winter use; it must be renewed by seed annually, for which purpose the seed is imported from France and Italy into England. Pot marjoram, *Origanum onites*, was not introduced into English cultivation until the middle of the last century. It is a hardy perennial, with a hairy stem, rising to more than a foot high; it blooms from July to November, and is usually propagated by cuttings.

BASIL (*Ocimum*) is rich in aroma, its odour and pungency being very similar to those of cloves. It is a favourite herb among French cooks, as giving an additional zest to highly-seasoned dishes. The leaves in small quantities are sometimes mixed in salads, or are made a flavouring ingredient in soups.

BALM (*Melissa officinalis*) is a native of the south of France, and was introduced into this country in 1573. It is a hardy perennial.

Balm was long famed for its medicinal virtues; and although it has ceased to be invested with its former supposed potent qualities, it still retains a kind of posthumous fame, and "balm" has become the generic name for a soothing healer of wounds, both of the body and the mind. Balm was the plant which the adept Paracelsus selected from which to prepare his *elixir vitæ*, his *primum ens melissæ*, whereby he was to renovate man; and, if he did not bestow on him absolute immortality, to produce a very close approximation to that state. Such strange conceits of ill-directed minds have, however, long gone by; and balm, stripped of its fancied virtues, is now only employed as an infusion in preparing a cooling drink, or in giving flavour to a weak factitious wine.

There are other seasoning herbs which were once much esteemed in this country, but are now little used. Among these are, Tarragon, Chervil, Borage, Costmary, and Marigold. The leaves and flowers of these plants were in request for their slight aromatic taste; and they sometimes imparted their flavour to "cool tankards," and sometimes to soups and salads. There was a notion that they produced exhilaration of spirits, and some of

them were called "comforters of the heart." The delusion has passed away, yielding in too many cases to more violent excitements, and in others to the conviction that the heart must derive its best comfort from a steady performance of our duties.

The lettuce, endive, and some other plants are used as salads, and although they do not contain compounds recognised as volatile oils, yet they contain peculiar secretions which have caused them to be used as food by animals, and which probably act medicinally.

Vegetables which are eaten raw, either in their natural state or blanched, are usually termed acetarious, or salad plants. Though these contain scarcely any nourishment, and are not at all essential accompaniments to a meal, yet they are recommended by so agreeable a coolness, pungency, or flavour, as to render the food with which they are eaten more grateful to the palate; while some are considered a wholesome addition to more substantial aliment.

LETTUCE (*Lactuca sativa*), has acquired its generic name from the milky juice which it contains. This species comprises many varieties, all of which possess a slightly narcotic principle in their juice, which is, in general, elaborated only in small quantities during the early stages of the plant, but increases greatly as that advances towards flowering. This juice is very bitter, and when it becomes abundant, the plant ceases to be useful.

The absolute quantity and strength of the opiate portion of the juice most probably varies both with the variety of the plant and with the soil on which it is produced. In the strong-scented wild lettuce (*Lactuca virosa*) the narcotic juice is so abundant, and so acrid in itself, or so mixed with other acrid principles, as almost to bring the plant within the class of vegetable poisons.

The narcotic property of lettuce juice has long been familiarly known. This quality has not been overlooked even by the poets. Pope says,

"If your wish be rest,
Lettuce and cowslip-wine Probatum est."

It is only very recently, however, that this juice, inspissated, or the extract of lettuce, has found a place among our pharmaceutic preparations, under the name of *Lactucarium*. It is supposed to possess, though in an inferior degree, the virtues of opium, without producing the same deleterious effects; and, therefore, it is held that it may be safely administered in cases where the more powerful medicine is not desirable, or even admissible. Brechin, in the county of Forfar, is among the places where the lettuce is cultivated, and its juice collected in considerable quantity for medical purposes. The plants are grown in a dell, composed of rich soil, and opening to the south. In so favourable a situation they thrive very vigorously, sending up thick and juicy flower-stems. As soon as these have attained a considerable size and height, but before the flowers begin to expand, a portion of the top is cut off transversely. This operation is performed when the sun has excited the plants into powerful action. The milky juice quickly exudes from the wound, while the heat of the sun renders it so immediately viscid, that it does not flow down in a fluid state, but concretes around the part whence it issues, forming a brownish scale, about the size of a sixpence. When it has acquired the proper consistence it is removed, and as the inspissated juice closes up the extremities of the divided vessels, it is necessary to cut off another small piece of the stem; this causes the escape of the juice again, and another scale is formed. The same process is repeated as long as the weather is favourable or the plant will yield any juice.

Under so variable an atmosphere as that of Britain, a crop of this kind must be precarious; unless in those places where there is generally a week or two of settled drought about the warmest period of the year, and where the cultivator has sufficient local knowledge for enabling him to time the state of his plants accordingly. Mr. Henderson, the Brechin cultivator, an intelligent and experienced horticulturist, states, that in favourable years the lettuce-opium, notwithstanding the trouble of collecting it, is much more profitable than any other crop that comes to

maturity, in so short a time, upon the same breadth of land.

Turner mentions the lettuce as being, in 1652, not a rare or recently cultivated plant, but one with which the public generally had been long familiar. In the Privy-Purse expenses of Henry VIII., in 1530, we find that the gardener at York-Place received a reward for bringing "lettuze" and cherries to Hampton Court. Although it cannot now be definitely ascertained when or how this plant was first introduced into England, we are no doubt indebted for some of its varieties to the Greek islands. The *Cos* lettuce, as its name indicates, is a native of the island of *Cos*, and was most probably brought thence into this country.

The culture of this plant is so simple, and it requires so little space, that a garden of the most humble dimensions is seldom found without having a small nook appropriated to this cooling and agreeable vegetable. There are many varieties of the lettuce, very nearly twenty being enumerated as objects worthy of garden culture, and each of them differing somewhat in colour, shape, or some other circumstance attending its growth. These, however, may all be ranged under two distinctive heads, the *Cos* and the *calbasse* lettuce. The former grows upright, and its leaves are of an oblong shape; the latter has rounder leaves folded together, and forming a low full head, spreading out close to the ground. When in perfection for gathering, the leaves of both sorts are lapped one over the other in a compact close order, forming what is usually called the *heart*, the inner part of which, being thus excluded from light and air, becomes nearly white. This natural blanching is often assisted by artificial means, and when the inner leaves begin to close, the outer ones are tied round them with a piece of *bast*.* The blanching prevents the formation of the bitter or acrid principle, which is very perceptible in all the varieties, if allowed to remain in the ground and

* The material of Russia matting, made from the inner bark of the lime-tree, and which is a well-known essential in kitchen-gardens.

complete their growth, when the leaves expand and the flower-stalk begins to ascend.

Lettuce being a hardy and free growing plant, may be obtained early in the season, if sown in a warm border, and protected from the frost during the night. For early use the *cabbage* is the best; as in that stage it is more delicate in flavour than the other; but when both have arrived at maturity, the *Cos* is the most succulent.

ENDIVE (*Cichorium endivia*) is abundantly cultivated, if not found wild, in China and Japan; and thus the accounts that describe it as a native of those countries, and as having been imported into the West about the early part of the sixteenth century, have probability on their side. Few particulars of the history of this plant, however, are known.

It is a hardy annual, producing a great stock of leaves from the crown of the root. These leaves are large, smooth on the surface, but much divided into lobes, and toothed at the edge. The flowering stem rises to the height of about two feet, and the flowers, which are of a pale blue colour, bloom in July and August. Like the lettuce, its leaves are used as an edible before its flowering stem begins to appear. These leaves are very harsh and bitter when exposed to the air; they are therefore blanched, and if this be properly performed, they become crisp and tender, and retain only an agreeable bitterness. Endive may be blanched for use by tying the leaves together, by earthing up the plants, or by covering them with pots. By judicious culture and a succession of sowing, endive may be obtained during autumn, winter, and spring; it is considered a valuable salad at a time when few other vegetables are furnished for the table; and it also serves as an ingredient in some other culinary preparations.

Succory, Chicory, or Wild Endive (*Cichorium intybus*). There is little doubt that the *Cichorium*, as mentioned by Theophrastus, in use among the ancients, was the wild endive, since the names by which this plant is known in all the languages of Modern Europe are merely corruptions of the original Greek word; while there are

different names in different countries for the garden endive.

Succory is a hardy perennial plant, not uncommonly growing about the hedges of fields in those parts of England where the subsoil is lime. It will bear all the varieties of climate in Europe, being cultivated from Italy to St. Petersburg. This plant has a strong and fleshy root; the leaves have some resemblance to those of endive, differing only in being narrower, more feathery at the edges, and having the midrib beset with hairs. The flowering stem rises much higher, sometimes attaining to five feet in height; the flowers are like those of the garden plant in appearance as well as in time of blooming.

This plant is not much valued or cultivated in Britain. On the Continent it is held in greater esteem, and is used as an edible vegetable in a variety of ways.

Both in France and England succory has occasionally been cultivated as food for cattle; it is in a proper state for this purpose just as it is coming into flower.

The root of this plant is used as a substitute for coffee; and it is sometimes considered superior to the exotic berry. Dr. Howison* is of this opinion; while Dr. Duncan† believes that the plant might be cultivated for this purpose with great national advantages. In many parts of Holland and Germany this prepared root is used in large quantities, either alone or mixed with coffee by those who cannot afford to indulge in the latter luxury in its genuine state. Indeed, it has been very recently introduced into this country as an addition which much improves the flavour of coffee; but where economy is not the consideration, it is not likely to gain much esteem. The succory root, when applied to this purpose, is merely cut in pieces, and sufficiently dried to admit of its being easily ground.

CRESS is the general name of a number of plants, mostly, if not all, bearing cruciform flowers, and possess-

* Caled. Hort. Mem. iv 132.

† Disc. to Caled. Hort. Soc. 1820.

ing, in common with plants of the same family, pungent and aromatic qualities.

GARDEN CRESS (*Lepidium sativum*) is a hardy annual, not found wild in England. Its native country is Persia, and also Cyprus. It has been cultivated here since the middle of the sixteenth century. This plant produces a number of small leaves, which are curled in some of the varieties and plain in others. The flowering stem is branched and rises to the height of about a foot and a half, producing white flowers which blow in June or July. It germinates very rapidly, and is most generally used in its earliest growth. In this state it is mixed with the young leaves of mustard, and is the most esteemed of all the small salads or plants which are used in the early leaf.

Its flavour is so warm and pungent as to have procured for it the name of pepper-wort. During the greater part of the year a constant supply may be obtained by sowing a portion every week, and the application of a moderate artificial heat will furnish it throughout the winter.

MUSTARD (*Sinapis alba*) is often found growing wild among corn, but it is very generally cultivated, being sown with the garden cress to be eaten in the seed-leaf as a small salad; but when the plants are of a more advanced growth, the leaves become harsh and rank. Its flowers appear in June or July, and these are succeeded by round rough pods. Like cress it most readily germinates, and is, indeed, of still quicker growth. The seeds, strewed on wet flannel, or on cork, floating on water, quickly put forth tender leaves, and a salad is thus in a few days produced at the winter fireside.

The *Sinapis alba* is not generally cultivated for its seeds, which are used as a condiment; the species usually grown for this purpose is the *nigra*.

BURNET (*Poterium sanguisorba*) is an upland perennial, found upon dry soils, and attaining to rather more than a foot in height. Its flowers, forming small greenish heads tinged with purple, appear in July.

The leaves, when bruised, smell like cucumber. They have a slightly pungent taste; but their chief value consists in their continuing green and fit for use during winter. This plant was formerly much more cultivated than it is at present.

GARDEN ROCKET (*Brassica erubo*) was likewise cultivated by our ancestors, who first obtained it from Austria in 1573. It has now entirely fallen into disuse in this country, but is still to be found in gardens on some parts of the Continent.

The list of plants which are occasionally eaten as salads is so numerous, and some of them are so little used, that a further detail of them would possess little interest. In fact any plant of rapid growth, and which has the seed-leaves pungent, without any deleterious property, may be used as small salad.

CELERY (*Apium graveolens*). There are several varieties of the cultivated celery. The upright kinds are distinguished as the red and the white, and by having their stems either hollow or solid. Of these the red variety is of a coarse but more hardy nature than the others, and though not so good in its crude state, is well adapted for stews and soups.

The blanched footstalks of the leaves are the part generally used as an esculent. The Italians, however, make the unblanched leaves as an ingredient for soup; and when no other part of the plant can be obtained, the seeds alone will communicate a very agreeable flavour to certain culinary preparations.

The turnip-rooted celery, or celeriac, is more hardy than the upright varieties. The root of this is the only part used. It attains to a very considerable size, especially in Germany, where it is much esteemed, either as forming an ingredient with other viands, or prepared by itself, the outer coat and fibres being always previously detached. The boiled root, sliced when cold, and mixed with oil and vinegar, is considered a very choice salad.

CHAPTER XXVIII.

ALKALOIDS :—TEA, COFFEE, CHOCOLATE, PARAGUAY
TEA.

IN the tissues of various parts of plants, giving to many of them their peculiar properties, have been found a class of substances called alkaloids, on account of their resemblance in chemical relations to the alkalies potassa and soda. These alkaloids have been the result of recent chemical research, and they have added greatly to the resources of the medical man in the treatment of disease. In almost every case they have been found to form the active principle of the plants from which they are obtained. Thus Quinine is found to be the active principle of the various forms of Cinchona bark, Strychnia of the *Strychnos nux vomica*, Morphia of Opium, and so on.

There can be no doubt that in many of the plants which man takes as food these alkaloids are present, and exert an influence upon the system. It has not, however, till recently been found that in particular kinds of food one of these alkaloids forms a conspicuous ingredient. It is now known that an alkaloid exists in tea, coffee, and chocolate; and, what is very remarkable, this substance is the same in both tea and coffee, and closely analogous in chocolate. This alkaloid is called *Theine*, from its having been first discovered in tea (*Thea*), and the Caffeine of chemists is identical with it. It is curious that the only substance used by other nations that could vie with the consumption of tea, coffee, and chocolate in Europe, the Paraguay tea, used by the inhabitants of South America, contains also this identical alkaloid, Theine. From this we think it may be fairly inferred that this alkaloid is the substance for the sake of which these plants are had recourse to. There can also be little

doubt that the action of this substance is purely medicinal, and we have therefore classed these plants amongst those yielding medicinal secretions.



Tea (*Thea viridis*).

TEA.—The history of commerce does not, perhaps, present a parallel to the circumstances which have attended the introduction of tea into Great Britain. This leaf was first imported into Europe by the Dutch East-India Company, in the early part of the seventeenth century; but it was not until the year 1666 that a small quantity was brought over from Holland, to this country by the Lords Arlington and Ossory.

In the year 1662, King Charles II. married a princess of Portugal, whence Waller says, "the best of queens and the best of plants we owe to that bold nation." But tea must have continued to be brought in small quantities only; for in the year 1664 the East India Company purchased, for the purpose of presenting to the king, two pounds two ounces of tea; and in the year 1678 they imported 4713 pounds of tea, which was then for the first time thought worthy their attention as a branch of their trade.

The tea-plant is indigenous to China or Japan, and probably to both. It has been used among the natives of the former country from time immemorial; and, from the age of Confucius, has been the constant theme of praise with their poets. It is only in a particular tract of the Chinese empire that the plant is cultivated; and this tract, which is situated on the eastern side, between the 30th and 33rd degree of north latitude, is distinguished by the natives as "the tea country." The more northern part of China would be too cold; and farther south the heat would be too great. There are, however, a few small plantations to be seen near to Canton.

The tree or shrub whence the Tea of commerce is derived is the *Thea* of botanists. It is very closely allied to the genus *Cammellia*, and Mr. Griffith, who is well qualified to give an opinion, states that there is no difference between the two genera. The genus *Thea* has a persistent calyx without bracts, five-leaved imbricated leaflets, the outer ones smaller. The petals of the corolla from 6 to 9, hypogynous, imbricated, the inner ones the largest, all adhering together at the base. The stamens are numerous, in several rows, adhering to the bottom of the petals, the filaments filiform, the ovary free and 6-celled.

There are but few species of *Thea*, some botanists assert only one; but, before proceeding to discuss the question of the varieties which yield the teas of commerce, we will describe those usually treated as distinct in systematic works.

T. viridis is a large, strong-growing, almost hardy plant, with spreading branches; its leaves from 3 to 5 inches long, thin, almost membranous, very broadly lanceolate, light green, and wavy, with large irregular serratures; the flowers large, white, usually solitary, mostly confined to the upper axil, with 5 sepals, from 5 to 7 petals, and a nodding fruit. This species is supposed to yield the green tea of commerce. It has repeatedly flowered in England, and may now be seen in the botanical gardens at Kew; Messrs. Loddiges, &c.

T. Bohea is a smaller and more delicate plant than

T. viridis: the leaves are not above two-thirds the size of the former species; they are elliptical, oblong, perfectly flat, more coriaceous, of a dark-green colour, with small and even serratures; they are numerous, and have in their axils two or three flowers of 5 sepals and 5 petals; they are small and have a slight odour, and flower later in the season than *T. viridis*. This plant is supposed to yield the leaves which are converted into black tea, and is a much more tender plant than the green-tea plant, being unable to stand the cold of an English climate. There has been and still is great controversy on the question whether the tea of commerce is the produce of but one plant or a variety of species. The difficulty arises from the fact that no competent person has ever been allowed to visit the tea districts of China as to make a satisfactory report. The Chinese in the neighbourhood of Canton prepare a tea which is coloured and made up to imitate the various qualities of green tea, and large quantities are thus yearly exported. Tea having become so extensive an article of commerce, various attempts have been made to introduce it into other countries, and this experiment has attracted considerable attention from the cultivation of the tea-plant in Assam, the Himalaya, &c. The Assam tea-plant grows wild, and appears to partake of the characters of both *Thea bohea* and *T. viridis*. It first attracted public attention in consequence of replies to the circulars which had been sent to various gentlemen, and it was then discovered that certain individuals had for a length of time been aware of the existence of a kind of tea in this district. The situation of Assam is undoubtedly favourable for the culture of fine-flavoured teas, and the experiment, which has now been tried for five years, seems to be answering as well as can be expected. Each year the quantities have increased and the qualities improved; and, in order to account in a great measure for the inferiority of the flavour to that of Chinese tea, it must be borne in mind that very much depends on the preparation of the leaf, which requires long-practised and delicate hands to accomplish it. As soon as the plantations are sufficiently

extended to induce Chinese tea-preparers to settle there, a difference must be found in the quality of the tea. In China no trouble or pains are spared to secure the excellence and flavour of the finest sorts of tea. The collectors are trained to it from a very early age, and some weeks before the harvest commences they are prohibited from eating fish, or any other food which is considered unclean, lest their breath should contaminate the leaves. They are also made to take a bath two or three times a-day, and are not allowed to touch the leaves with the naked fingers, but always wear gloves. The finest tea may, if the proper time for gathering it be neglected, be turned into an inferior tea in a single night. The Chinese propagate the plant by seed, and so uncertain is the vegetation that even in their own native climate it is necessary to sow as many as seven or eight seeds together in small holes in rows four or five feet asunder. The ground between each row is always kept free from weeds, and the plants are not allowed to attain a higher growth than admits of the leaves being conveniently gathered. The first crop of leaves is not collected till the third year after sowing, and when the trees are six or seven years old the produce becomes so inferior that they are removed to make room for a fresh succession. The plant will grow in either high or low situations, but always thrives best and furnishes leaves of the finest quality when produced in light stony ground. The leaves are gathered from one to four times during the year, according to the age of the tree. Most commonly there are three periods of gathering: the first commences about the middle of April, the second at Midsummer, and the last is accomplished during August and September. The leaves that are earliest gathered are of the most delicate colour and most aromatic flavour, with the least portion of either fibre or bitterness. Leaves of the second gathering are of a dull green colour, and have less valuable qualities than the former; while those which are last collected are of a dark green, and possess an inferior value. The quality is further influenced by the age of the wood on which the leaves are borne, and by the degree of expo-

sure to which they have been accustomed; leaves from young wood, and those most exposed, being always the best.



Tea-gathering—from a Chinese drawing.

The leaves, as soon as gathered, are put into wide shallow baskets, and placed in the air or wind, or sunshine, during some hours. They are then placed on a flat cast-iron pan, over a stove heated with charcoal, from a half to three-quarters of a pound of leaves being operated on at one time. These leaves are stirred quickly about with a kind of brush, and are then quickly swept off the pan into baskets. The next process is that of rolling, which is effected by carefully rubbing them between men's hands; after which they are again put, in larger quantities, on the pan, and subjected anew to heat; but at this time to a lower degree than at first, and just sufficient to dry them effectually without risk of scorching. This effected, the tea is placed on a table and carefully picked over, every unsightly or imperfectly-dried leaf that is detected being removed from the rest, in order that the samples may present a more even and a better appearance when offered for sale. With some finer sorts of tea a different manipulation is employed; the heated plates are dispensed with, and the leaves are carefully rolled into balls, leaf by leaf, with the hands.

The names whereby some of the principal sorts of tea are known in China, are taken from the places in which they are produced, while others are distinguished according to the periods of their gathering, the manner employed in curing, or other extrinsic circumstances.

Bohea, of which description there are five kinds, takes its name from the mountain of You-yee, which is covered with tea-plantations. The earliest gatherings, in this district, is called Souchong, the Chinese name for which is *Saatyang*; and *Pekoe*, called by the cultivators *back-ho*, or *pack-ho*; Congou, *Kong-fou*, and other commoner kinds of Bohea-tea, are made from the leaves when in a state of greater maturity. Padre-Souchong, or *Pao-sut-tcha*, is gathered in the province where the best green tea is produced. This kind is esteemed on account of some medicinal virtues which it is supposed to possess.

There are three kinds of green tea, of which one called hyson, *hayssuen*, is composed of leaves very carefully picked, and dried with a less degree of heat than others; it is one-fourth drier than souchong. The kind of green tea which is most abundant is called Singlo, which is the name of a mountain on which it grows, about one hundred and fifty miles to the southward of Nan-king. Gunpowder tea is made of tender green leaves, which yet have attained a considerable size. This kind is sometimes rolled into balls by hand, and is very highly esteemed; it sells for fifteen per cent. more than hyson. It is a commonly received opinion, that the distinctive colour of green tea is imparted to it by sheets of copper, upon which it is dried. For this belief there is not, however, the smallest foundation in fact, since copper is never used for the purpose. Repeated experiments have been made to discover, by an unerring test, whether the leaves of green tea contain any impregnation of copper, but in no case has any trace of this metal been detected.

The succulent tea-leaves are sometimes twisted into thin rolls or cords, about an inch and a half or two inches long, and several of these are tied together by their ends,

with coloured silk threads. This is done with both green and black tea.

The Chinese do not use their tea until it is about a year old, considering that it is too actively narcotic when new. Tea is yet older when it is brought into consumption in England, as, in addition to the length of time occupied in its collection, and transport to this country, the East-India Company are obliged by their charter to have always a supply sufficient for one year's consumption in their London warehouses; and this regulation, which enhances the price to the consumer, is said to have been made by way of guarding, in some measure, against the inconvenience that would attend any interruption to a trade entirely dependent upon the caprice of an arbitrary government.

The people of China partake of tea at all their meals, and frequently at other times of the day. They drink the infusion prepared in the same manner as we employ, but they do not mix with it either sugar or milk. The working classes in that country are obliged to content themselves with a very weak infusion. Mr. Anderson, in his narrative of Lord Macartney's embassy, relates that the natives in attendance never failed to beg the tea-leaves remaining after the Europeans had breakfasted, and with these, after submitting them again to boiling water, they made a beverage which they acknowledged was better than they could ordinarily obtain.

The rich and luxurious Chinese keep their tea in fine jars of porcelain, some of which are thought to communicate an additional aroma to the tea, and all of which have narrow mouths (as may be seen in those brought to Europe and sold at a high price) to retain the peculiar odour. If the tea contracts damp, it is taken out and dried again. Siebold is of opinion the agreeable violet-like flavour of tea is inherent in the leaves themselves; but most writers ascribe the different flavours of the choicest kinds of tea to the admixture of the flowers, leaves, or oils of other plants. The Chinese dry many millions of pounds of the leaves of various plants to mingle with the genuine tea-leaf; so that all the spurious leaves found in parcels of bad tea must not be ascribed

to adulteration by the dealers in this country. The action of tea upon the human system has been much discussed, and gives rise to various opinions. It has been preposterously praised by some and unjustly accused by others of producing various diseases: above all, it has been charged with causing an increase in nervous diseases. It would perhaps be more just to attribute the increase of such complaints to the more complicated state of our social relations, arising from an augmented population, an advance in luxury and indulgence, and a more general infringement of the laws which nature demands shall be observed for the preservation of health. That tea should not suit all ages and constitutions, is not remarkable. It is less suited for young persons and children than adults, and should by no means take the place of more solid food; yet there appears to be a want in the system which it is eminently adapted to supply, and in peculiar states of the brain produced by alcoholic stimulants or by intense mental excitement it is a salutary remedy. On the contrary, in cases of diminished excitement its effects are injurious. Persons of a gouty and rheumatic nature—above all, those subject to calculous diseases of the lithic acid diathesis—find weak tea the least objectionable article of common drink. They should take it without sugar and very little milk. The medical application of tea is very limited. In fevers it is sometimes used as a diluent at the commencement, and a tincture of tea, made by macerating tea in proof spirit and adding a teaspoonful of this to a small portion of water, has been used and found of service after the acute symptoms have subsided. As an antidote to poison it is nearly as powerful a remedy as coffee; and some cases of poisoning by arsenic and tartarized antimony have been overcome by the immediate administration of a very strong infusion of tea. Tea has been denounced as a useless article of luxury and extravagance to the poor; and some writers have undertaken to calculate the amount yearly uselessly expended on this article of diet; but the observations of Liebig seem to offer a satisfactory explanation for the apparent necessity which exists for the use of this beverage from the highest to the lowest class in

civilised communities. The action of caffeine and theine on the system are in all respects identical; and without entering minutely into the medical action of these properties, Liebig proves that, with the addition of oxygen and the elements of water, they will yield *taurine*, the nitrogenized compound peculiar to bile. If, therefore, an infusion of tea contains no more than one-tenth of a grain of theine, still if it contribute to the formation of bile, the action even of so small a quantity has an influence on the system. When there exists an excess of non-nitrogenized food or a deficiency of exercise, which in a healthy and natural state of the body would produce the nitrogenized substances secreted in the formation of bile, the use of a chemical agent capable of supplying this important deficiency must certainly be beneficial. Its action may be imperceptible, but it unquestionably exists; and these two great principles, caffeine and theine, are better adapted to the purpose than all other nitrogenized vegetable products. These facts account in some measure for the universal use of this beverage, and in what manner it supplies the place of more solid food to the poor, as well as the reason for its great popularity amongst females and those who take but little exercise. The first importation of tea into England by the East India Company took place in 1676, when the directors ordered their servants to send home by one of these ships one hundred pounds of the best "*try*" they could produce. In 1678 4713 lbs. were imported; but in the six following years the entire imports amounted to no more than 410 lbs. In 1725 the consumption of tea in England amounted to 370,323 lbs., and in 1844 it had increased to 36,681,877 lbs. For above a century and a half the sole object of the East India Company's trade with China was to furnish a supply of tea for the consumption of the United Kingdom. They enjoyed an entire monopoly in this respect and realised immense prices; but by the interference of Government this great channel of wealth was directed into a different course, and the duty on tea now produces about one-thirteenth of the total revenue. The number of tea-dealers in 1839, in England, was 32,794; in

Scotland, 13,611; in Ireland, 12,774: total, 109,179. Tea is now sold by the importing merchants by public auction and private sales. Between the years 1631 and 1841 the population of the United Kingdom increased 14 per cent., and the consumption of tea increased 16 per cent. The proportion of black to green teas consumed in England is about as 5 to 1. In America the use of green tea is the greatest. The total export from Canton to Europe and America exceeds 50,000,000 lbs. Russia takes 6,500,000 lbs.; the United States about 8,000,000 lbs.; France, 2,000,000 lbs., and Holland about 2,800,000 lbs. The green-tea districts are about 700 miles from Canton, and those where the black tea is made about 200 miles distant. The article is brought from Canton by land-carriage, chiefly by porters, and canals; and the number of tea-merchants assembling at Canton during the season of active trade is about 700.*

Coffea is the seed contained in a berry, the produce of a moderate-sized tree called the *Coffea Arabica*, and which has also been named *Jasminum Arabicum*. This tree grows erect, with a single stem, to the height of from eight to twelve feet, and has long, undivided, slender branches, bending downwards: these are furnished with evergreen opposite leaves, not unlike those of the bay-tree. The blossoms are white, sitting on short footstalks, and resembling the flower of the jasmine. The fruit which succeeds is a red berry, resembling a cherry, and having a pale, insipid, and somewhat glutinous pulp, inclosing two hard oval seeds, each about the size of an ordinary pea. One side of the seed is convex, while the other is flat, and has a little straight furrow inscribed through its longest dimension: while growing, the flat sides of the seeds are towards each other. These seeds are immediately covered by a cartilaginous membrane which has received the name of the *pericarpium*. They consist of much horny albumen, and a peculiar principle or alkaloid termed *caffeine*, which contains more nitrogen than any other known vegetable substance, and is identical with theine. In its raw state the seed is used as a

medicine, but when roasted it is not only valuable as a medicine, but as an extensive article of diet and luxury.

Botanists have enumerated several varieties of this tree as existing in the Eastern and Western Hemispheres. These varieties result from accidents of soil and climate, and must have been produced subsequently to the naturalizing of the plant in America, since it is pretty certainly shown that all the coffee-trees cultivated there are the progeny of one plant, which so recently as the year 1714 was presented by the magistrates of



• Coffee, with the Flower and Berry

Amsterdam to Louis XIV., King of France. This plant was placed at Marly under the care of the celebrated

Mons. de Jussieu, and it was not until some years after this that plants were conveyed to Surinam, Cayenne, and Martinico. The cultivation must have afterwards spread pretty rapidly through the islands, since in the year 1732 the production of coffee was considered to be of sufficient consequence in Jamaica to call for an act of the legislature in its favour.

The use of coffee as an alimentary infusion was known in Arabia, where the plant is supposed to have been indigenous, long before the period just mentioned. All authorities agree in ascribing its introduction to Megaladdin, Mufti of Aden, in Arabia Felix, who had become acquainted with it in Persia, and had recourse to it medicinally when he returned to his own country. The progress which it made was by no means rapid at first, and it was not until the year 1554 that coffee was publicly sold at Constantinople. Its use had, in the meanwhile, been much checked by authority of the Syrian government, on the ground of its intoxicating qualities; but more probably because of its leading to social and festive meetings incompatible with the strictness of Mohammedan discipline.

A similar persecution attended the use of coffee soon after its introduction into the capital of Turkey, where the ministers of religion having made it the subject of solemn complaint that the mosques were deserted while the coffee-houses were crowded, these latter were shut by order of the Mufti, who employed the police of the city to prevent any one from drinking coffee. This prohibition it was found impossible to establish, so that the government, with that instinctive faculty so natural to rulers of converting to their own advantage the desires and prejudices of the people, laid a tax upon the sale of the beverage, which produced a considerable revenue.

The consumption of coffee is exceedingly great in Turkey, and this fact may in a great measure be accounted for by the strict prohibition which the Moslem religion lays against the use of wine and spirituous liquors. So necessary was coffee at one time considered among the people, that the refusal to supply it in reasonable

quantity to a wife, was reckoned among the legal causes for a divorce.

Much uncertainty prevails with respect to the first introduction of coffee into use in the western parts of Europe. The Venetians, who traded much with the Levant, were probably the first to adopt its use. A letter, written in 1615 from Constantinople, by Peter de la Valle, a Venetian, acquaints his correspondent with the writer's intention of bringing home to Italy some coffee, which he speaks of as an article unknown in his own country. Thirty years after this, some gentlemen returning from Constantinople to Marseilles brought with them a supply of this luxury, together with the vessels required for its preparation; but it was not until 1671 that the first house was opened in that city for the sale of the prepared beverage.

Coffee-houses date their origin in London from an earlier period. The first was opened in George Yard, Lombard Street, by one Pasqua, a Greek, who was brought over in 1652 by a Turkey merchant named Edwards.

The first mention of coffee that occurs in our statute-books is found in the act 12th Car. II. cap. 24 (Anno 1680), whereby a duty of fourpence per gallon, to be paid by the maker, was imposed upon all coffee made and sold: three years after this, coffee-houses were directed to be licensed by the magistrates at quarter-sessions.

Coffee cannot be cultivated to advantage in climates where the temperature at any time descends below fifty-five degrees of Fahrenheit's scale. The trees flourish most in new soils on a gentle slope, where water will not lodge about the roots. In exposed situations it is necessary to moderate the scorching heat of the sun by planting rows of umbrageous trees at certain intervals throughout the field.

Coffee-trees are usually raised from seed in nursery-grounds, and are afterwards planted out at regular distances, which vary according to the nature of the soil. Where this is very dry or gravelly, the trees seldom rise higher than six feet, and may be planted five feet apart, but in rich soils, where they attain the height of

nine or ten feet, or more, the plants should not be so crowded; and intervals of eight or ten feet should be left between them.

It is well known that coffee imported from the West Indies does not equal in its flavour that produced in Arabia and other parts of the East; and it is commonly imagined that this inferiority is principally owing to local causes, and is therefore incapable of being remedied. There is reason for believing, however, that the superior quality of Turkey and East-India coffee is not in any great degree to be referred to the influences of soil and climate, but depends, in part at least, upon the age to which the seeds are kept before they are brought into consumption. Trees planted in a light soil, and in dry and elevated spots, produce smaller berries, which have a better flavour than those grown in rich, flat, and moist soils: the weight of produce yielded by the latter is, however, double that obtained from the former; and as the difference in price between the two is by no means adequate to cover this deficiency of weight, the interest of the planter naturally leads him to the production of the largest but least excellent kind. It is confidently asserted that this difference of quality entirely disappears by keeping, and that "the worst coffee produced in America will, in a course of years not exceeding ten or fourteen, be as good, parch and mix as well, and have as high a flavour as the best we have now from Turkey."

The trees begin bearing when they are two years old; in their third year they are in full bearing. The aspect of a coffee-plantation during the period of flowering, which does not last longer than one or two days, is very interesting. In one night the blossoms expand themselves so profusely as to present the same appearance which has sometimes been witnessed in England when a casual snow-storm at the close of autumn has loaded the trees while still furnished with their full complement of foliage. The seeds are known to be ripe when the berries assume a dark red colour, and if not then gathered will drop from the trees. The planters in Arabia do not pluck the fruit, but place cloths for its reception beneath the trees, which they shake, and the ripened

berries drop readily. These are afterwards spread upon mats and exposed to the sun's rays until perfectly dry, when the husk is broken with large heavy rollers made either of wood or stone. The coffee thus cleared of its husk is again dried thoroughly in the sun, that it may not be liable to heat when packed for shipment.

The method employed in the West Indies differs from this. Negroes are set to gather such of the berries as are sufficiently ripe, and for this purpose are provided each with a canvas bag having an iron ring or hoop at its mouth to keep it always distended, and this bag is slung round the neck so as to leave both hands at liberty. As often as this bag is filled, the contents are transferred to a large basket placed conveniently for the purpose. When the trees are in full bearing, an industrious man will pick three bushels in a day. If more are gathered, proper care can hardly be exercised in selecting only the berries that are ripe : it is the usual calculation, that each bushel of ripe berries will yield ten pounds' weight of merchantable coffee.

In curing coffee it is sometimes usual to expose the berries to the sun's rays in layers, five or six inches deep, on a platform. By this means the pulp ferments in a few days, and having thus thrown off a strong acidulous moisture, dries gradually during about three weeks : the husks are afterwards separated from the seeds in a mill. Other planters remove the pulp from the seeds as soon as the berries are gathered. The pulping-mill used for this purpose consists of a horizontal fixed roller acting against a moveable breast-board so placed as to prevent the passage of whole berries between itself and the roller. The pulp is then separated from the seeds by washing them; and the latter are spread out in the sun to dry. It is then necessary to remove the membranous skin or parchment, which is effected by means of heavy rollers running in a trough wherein the seeds are put. This mill is worked by cattle. The seeds are afterwards winnowed to separate the chaff, and if any among them appear to have escaped the action of the roller, they are again passed through the mill.

Much depends upon the manner of roasting and making coffee, and the French have been almost universally extolled in the preparation of this beverage. They use but little Mocha coffee, which proves that the superiority of the Arabian plant over the West Indian is much less than has been supposed. Beans of a good quality are hard and heavy, sink quickly in water, are of a light yellowish green colour, not discoloured or black, and possess the odour of coffee, which though faint is peculiar, and are free from any damp smell. Beans recently collected are not nearly so good as those which have been kept about a year; when much older, they lose some of their flavour. From the analysis of Seguin and Schrader, coffee consists of coffee-bitter (impure coffee), solid fat, resin, a little aromatic principle, gum, albumen (this albumen, according to Seguin, unites with the yellow coffee-bitter, and forms a green), and lignin. The taste of raw coffee is somewhat sweetish, but the application of heat produces important changes. The bean increases to nearly twice its original size, and loses about a third of its weight. A powerful aromatic odour is evolved, and a large quantity of empyreumatic oil, which appears in small drops on the surface, is formed along with a bitter principle, probably by an alteration in the caffein and of the saccharine matter. The roasting of coffee should take place in a close revolving cylinder over a clear but moderate fire, and should not be carried too far, as is generally the case in Britain, when the beans have acquired a light chestnut colour, the process is completed, and they should then be cooled quickly by being tossed up into the air, and ground immediately in a covered mill or mortar. The infusion should be prepared as soon as possible from the powder; about half an ounce being used for every half-pint of water. In this speedy succession of the various steps of preparation, lies the secret of the excellency of Continental coffee, and the inferiority of our own. When the beans are roasted some days or perhaps weeks before the beverage is prepared, a large portion of the aroma is dissipated, and its fine flavour destroyed. The employment of white of egg or

fish-skin to clarify coffee is objectionable; clearness is thus purchased at the expense of strength. The addition of milk, which should always be hot, and of sugar, heightens the nourishing qualities of this beverage, and in the morning renders it a substantial article for breakfast, but when it is taken after dinner to promote digestion, the milk, and if possible the sugar, should be dispensed with. The action of coffee on the system is chiefly owing to the empyreumatic oil, and consequently it is greatest when roasted; but its extractive and highly nitrogenous principle must also considerably influence the organs of digestion. It acts powerfully on the ganglionic system of nerves and their ramifications. It elevates their vitality and quickens all their actions. Its influence on the brain is likewise very perceptible, and hence the increased activity and energy of that organ after the use of coffee, and the removal of all sense of fatigue and disposition to sleep. Upon this depends the use of coffee in counteracting the effects of narcotic poisons, such as opium and belladonna. It assists digestion and checks the disturbance of the nervous system arising from too free a use of stimulants, and this will account for its frequent use after dinner. It excites the vascular system and renders more powerful the contractions of all the muscles. It therefore enables the system to resist the influences of cold and damp, and is fitted for the inhabitants of damp climates and those who are exposed to a humid or night atmosphere. In warm climates it removes languor and helps the stomach to perform its office when enervated from the effects of excessive heat. Thus we see from its adaptation to the wants of the human frame in such a variety of circumstances, it has become an almost universally adopted and favourite article of diet, yet it is not without some disadvantages. For plethoric persons, and those who have a tendency to abdominal congestions, it is unsuited; and for persons subject to piles, it is generally improper. Those who have an excitable vascular system should abstain from its use, and on the whole it is more adapted for the slender and the advanced in life than for the young and robust. When used to an

Injurious extent, it gives rise to a nervous irritability, twitching of the eyelids, congestion, loss of digesting power, obstruction of the liver, &c. Coffee is, as we have said, much more extensively used as an article of diet than of medicine. Raw coffee has, however, been found serviceable in the cure of intermittent fevers. A strong infusion of it, without sugar or milk, often removes megrim or hemiplegia; and in some cases of asthma, with tincture of opium or alone, it has kept off the paroxysms. Strong coffee is the safest and best antidote to vegetable poisons which can be applied by unprofessional persons. It is much more proper than vinegar, which should never be given till all the poisonous substance has been removed from the stomach.

The quantity of coffee consumed in Europe is very great. Humboldt estimates it at nearly one hundred and twenty millions of pounds, about one-fourth of which is consumed in France. Since the time this estimate was made, however, a vast increase has taken place from the great amount of consumption in England.

The consumption of coffee in the United Kingdom appears, from official calculation, to have increased in the following ratio since 1820:—

1820	7,103,409 lbs.
1821	7,593,001
1822	7,669,351
1823	8,454,920
1824	8,262,943
1825	11,082,970
1826	13,203,323
1827	15,566,376
1828	17,127,633
1829	19,476,180
1830	22,691,522

It appears from this calculation that the reduction of the duty in 1825 was followed by an immediate and rapid increase in consumption, which rose from 8½ millions of pounds in 1824 to more than 22½ millions in

1830. At this point, the consumption having overtaken the supply of those kinds which were admissible at the lowest rate of duty, the increase stopped, and the consumption has since remained almost stationary. The net revenue derived from the importation of coffee into the United Kingdom in 1835, was 652,123*l*.

The CACAO, or Chôcolato-tree, is known to botanists by the name of *Theobroma*, signifying "food for a god," and which name was bestowed upon it by Linnæus, to mark his opinion of the excellent qualities of its seeds. Benzoni, who travelled in the sixteenth century, formed a very different estimate of its merits, and declared that chocolate was a drink "fitter for a pig than for a man."

The genus *Theobroma* consists of trees with large simple leaves and flowers always in clusters. The calyx is composed of five sepals; the petals are five, lengthened into a strap-like form at the apex. The stamens are five, each with double anthers and a horn-like appendage between each filament, the style is filiform with a five-parted stigma; the fruit a 5-celled capsule without valves, the seeds imbedded in a soft pulp, and thick oily wrinkled cotyledons. The species chiefly used in the manufacture of cocoa and chocolate are *T. cacao*, *T. speciosum*, *T. sylvestre*, and *T. subincanum*; and the fruits are collected from both wild and cultivated plants, the size and form of which vary with the species.

The Cacao-tree is carefully cultivated in many of the settlements in Spanish America, and particularly in Mexico, where, we learn from Humboldt, it was extensively reared so long ago as the time of Montezuma; and whence, indeed, it was transplanted into other dependencies of the Spanish monarchy. The names whereby the plant, and the food prepared from its seeds, are recognised in the present time, are both derived from the Mexican language, the former being called by that people *cayava qualhuatl*, and the latter, *chocolatl*. The seeds of the cacao were made use of as money in Mexico, in the time of the Aztec kings, and this use of them is still partially continued, the smaller seeds being

employed for the purpose. The lowest denomination of coined money current in Mexico is of the value of about sixpence; and as there must arise many petty transactions of business to a lower amount, the convenience of these seeds, six of which are reckoned as of the value of one halfpenny, must needs be very great.

The Cacao-tree seldom rises above the height of twenty feet; its leaves are large, oblong, and pointed. The flowers, which are small, and of a pale red colour, spring from the large branches; they are succeeded by oval-pointed pods, that contain a white pithy substance, which is sweet, but disagreeable, and surrounding numerous seeds: these are the cacao of commerce. These seeds are oval-formed, and about as large as a moderate-sized almond-kernel, but not so slender; they are internally of a very dark brown colour, approaching to black, and are covered with a thin skin or husk, of a light reddish brown colour. The nuts are very numerous, but vary in this respect, some pods containing as many as a hundred, while others do not yield more than twenty seeds: they are of a very oily nature.

The trees are raised from seed, which is sown under the shade of the coral-tree, or the banana, and they do not come into bearing until six or seven years old. Their cultivation does not call for any great application of labour; and when the trees are once in a productive state, they require but little attention beyond that necessary for merely collecting the produce. In some instances the fruit is buried in the earth in heaps, and allowed to ferment for thirty or forty days before being prepared for use, a process which greatly improves them and destroys the germinating power of the seed.

Cacao is principally used after having been made into cakes, to which the name of chocolate is given. The method anciently employed by the Indians in making these cakes, was simply to roast the seeds in earthen pots, and after clearing them from the husks, which by reason of the heat employed could be easily removed, the roasted seeds were bruised between two stones, and made up with the hands into cakes. The process at

present used by Europeans does not differ greatly from that just described: more care is taken in grinding the seeds after they are roasted, so as to convert them into a paste which is perfectly smooth, and some flavouring ingredients are added, according to the taste of the people who are to consume the chocolate. Cloves and cinnamon are much used for this purpose by the Spaniards; other aromatics, and even perfumes, such as musk and ambergris, have sometimes been added; but the principal flavouring ingredient used with cacao is vanilla, a short notice of which is subjoined. The intimate mixture of these substances having been effected, the whole is put while yet hot into tin moulds, where it hardens in cooling, and in this form, if preserved from the air, it will keep good for a considerable time. Chocolate is not very much consumed in England; it is in greater esteem in France; it forms the ordinary breakfast in Spain; and in Mexico, according to Humboldt, it is not considered an object of luxury, but rather of prime necessity.

For invalids plain chocolate is best, the perfumed being too heating, where tea and coffee disagree, cocoa or chocolate is the best substitute. It is sometimes said to create headache and to disturb the stomach. In almost all instances, however, this arises from making the beverage too strong. The printed directions order far too much of the substance to be used, half the quantity being generally sufficient. The Spaniards do not reckon chocolate very nutritious, for the priests, who are supposed to fast for many hours before going to mass, are allowed to drink it. This is however a convenient mistake. Schrader, who analyzed cocoa, regarded the latter principle as similar to caffeine. The analysis of theobromine by Woskresensky, shows how nearly he was correct, and that this article, being one of the most highly azotised vegetable compounds, is highly nutritious. Liebig considers that this principle contributes to the formation of bile, like theine.

The quantities of cocoa consumed in this country, since 1831 are as follows:—

1831	502,806 lbs.
1832	1,150,193
1833	1,268,287
1834	1,173,795
1835	1,085,980

The great increase in consumption between 1831 and 1832 was occasioned by the reduction of the duty in the latter year from sixpence to twopence a pound.

VANILLA (*Vanilla aromatica*) is a native of Mexico and of some parts of India. The Spaniards found its fruit in use among the Aztecs at the time of their first invasion of Mexico. At this day, although a considerable quantity of vanilla is collected in that state for the purpose of exportation, the people do not themselves employ them in the manufacture of chocolate—the only use to which they have ever been anywhere applied—conceiving them to be possessed of unwholesome properties.

The vanilla is a parasitical plant; its leaves are lanceolate and ribbed, eighteen inches long and three inches broad. Its flowers are white, intermixed with stripes of red and yellow colours; these are succeeded by long and slender pods, which at first are green, but become yellow as they ripen, and are then collected for use. The cavity of the pod contains, besides its numerous seeds, a substance which is black, oily, and balsamic; when recently gathered this is humid, and its odour is said to induce a kind of temporary intoxication. The pods are harvested during the three latter months of the year, and are usually dried by exposure to the sun's rays until they are made warm, in which state they are wrapped in woollen cloths, to promote and absorb evaporation. By this process the vanilla acquires a black hue, with a somewhat silvery appearance. Five of the pods thus treated will usually weigh one ounce. The vanilla plant is very easily propagated by cuttings: these reach about a foot in length, and are planted at the root of the tree without which it is intended to climb. These

plants will yield pods in their third year, and each will continue to furnish about fifty annually for thirty or forty years. What is a singular advantage in that climate, no insect will attack this plant.

PARAGUAY TEA, or MATE', is the produce of a plant belonging to the family Aquifoliaceæ. It was formerly supposed to be the produce of the *Ilex vomitoria*, which is found in North America, in the Carolinas, and Florida; but from specimens sent from Brazil to Mr. Lambert it appears to be a distinct species, which he has named *Ilex paraguayensis*. It is a shrub which attains the size of the orange-tree, quite smooth, with bluntish, wedge-shaped, remotely serrated leaves, with umbelliferous flowers seated in the axils of the leaves. It is the *Mate* of Saint Hilaire, and grows wild in Paraguay and Brazil, and is called by the Spaniards *Yerva Mate*. The leaves of this shrub are in great repute amongst the inhabitants of South America, and are used in infusion, in a similar manner to the tea in China. Upwards of 5,000,000 lbs. of the leaves of this tree are annually collected in Paraguay, and are sent to Chile and the viceroyalty of Buenos-Ayres. It is not cultivated. Merchants carry various articles into the interior, which they give the natives for their labour in collecting the leaves of the plant. After the branches are cut, the ground is heated by means of a fire, and the leaves being laid upon the heated ground, are dried, and afterwards they are beaten and pressed into bags, in which state it comes into the market. There are three kinds known in the market: the *Caa-cuys*, which is the bud of the leaf; the *Caa-mat*, the leaf with the veins without roasting; and the *Caa-quaya*, or *Yerva de Pulos* of the Spaniards, the whole leaf with the petioles and small branches roasted. The first does not steep well, and is seldom seen. The plant when used is steeped in boiling water, to which a little sugar, and sometimes lemon-juice, is added. It is drunk out of a vessel called *Maté*, which has a spout perforated with holes for the purpose of preventing the powdered herb from passing out with the fluid. The Creoles are

passionately fond of this beverage, and never partake of a meal without it. The properties of the plant are sedative and stimulant.

Another species of *Ilex*, the *I. Gonçiona*, found in Brazil, is applicable to the same purposes as the last, and, although inferior in quality, was used extensively as a substitute for the true Paraguay tea, when the export of the latter from Paraguay was forbidden by the dictator Piracicaba.

The *Ilex vomitoria* produces the Cassena of Florida and the Carolinas, which is used for the purpose of correcting the flavour of water.

END OF VOL. I.

